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LOGISTICAL PROBLEMS IN FUTURE WARFARE

Lieutenant Colonel Frank W. Moorman, *Signal Corps*
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THOUGHTFUL men throughout the ages have given their minds to forecasting the character of future wars. Professional soldiers in particular are haunted by the fear that they will become bemused by the techniques and methods that won the last war and thus lose that flexibility of mind needed to apply the general principles of all wars as the needs and occasions arise. It is a difficult problem and a vital one.

So, through the placid stream of peacetime military activity, there is a swirling undercurrent of thought and wondering that bubbles forth in the form of an idea for winning the next war instead of the last one. These ideas can never be set down in a rigid pattern, since they change every day with the course of events and with each man's thinking. Yet sometimes momentary trends appear and fix themselves briefly. A glance at some of these ideas which appear to be briefly fixed today may be of interest.

"We must have a hard-hitting, highly mobile striking force."

"Due to the atomic bomb and other weapons of mass destruction, we must have dispersion to the nth degree."

"We cannot have large ports, large stocks of supplies, or any other large concentration of men and materials."

"In the next war, we will not walk shoulder to shoulder across a continent. We will strike with our hard-hitting, highly mobile force and seize a small island of resistance at a vital, key point. From that vital, key point we will lash out viciously at another vital, key point, and the enemy will either (a) wither on the vine or (b) bleed to death."

"We have too many service troops."

These ideas all have interest, and possibly some of them have merit. Yet to the logistician who is faced with the dull job of translating fancies into fact, they present some intriguing difficulties. For instance:

"We must have a hard-hitting, highly mobile striking force."

This means a force which can hit harder than the force we had in the last War, and one which is more highly mobile. To hit harder, we must have more fire power. If we have more fire power, we must have more ammunition. To be more mobile, we must have more vehicles. Or we must learn to concentrate our fire power and our mobility potential at the decisive place and time. In other words, to hit harder and to move faster, we must either be stronger or attain the capability of concentrating our present strength.

Concentration is the job of the tacti-

In meeting the demands of future warfare, logistics is more concerned with time than distance. "Combat forces do not care how far away something is. What they want to know is how soon they can get it."

cian. The provision of additional strength is the job of the logistician. This strength must be in ammunition (Class V) and in fuel (Class III). The remaining classes of supply (Classes I, II and IV) do not increase appreciably. Now, how much is more?

During World War II, the daily expenditure of ammunition per division varied from 86 to 450 tons. Doubled, this is 172 to 900 tons per division per day; trebled, it is 258 to 1,350 tons; and increased 10 times, it is 860 to 4,500 tons.

Consumption of Class III supplies during World War II varied from 12 to 174 tons per division per day. If the fuel consumption is to be increased, these tonnages must be increased accordingly.

The logistician is faced with certain difficult realities if we are to have a hard-hitting, more highly mobile force. He must bring forward to the combat area more tonnages and more items. He must have the service troops to handle these additional items. He will take up more space on the ground.

"Due to the atomic bomb and other weapons of mass destruction, we must have dispersion to the nth degree."

Dispersion means less men, less materials, and less vehicles per square mile. The nth degree can mean anything, but to increase dispersion requires either more area or less items.

"We cannot have large ports, large stocks of supplies, or any other large concentration of men and materials."

This is just another way of saying dispersion. However, if we cannot have large ports, then we must have either a number of small ports or a decrease in the requirements for port capacity. If we cannot have large stocks of supplies, we must have either large numbers of small stocks of supplies or less supplies.

"In the next war, we will not walk shoulder to shoulder across a continent. We will strike with our hard-hitting,

highly mobile force and seize a small island of resistance at a vital, key point. From that vital, key point we will lash out viciously at another vital, key point and the enemy will (a) wither on the vine or (b) bleed to death."

This means nothing to the logistician except the phrase "small island of resistance." A small island means a small area which in turn affects dispersion. Dispersion can only be accomplished by increasing the area or decreasing the items. Otherwise, there is no dispersion.

"We have too many service troops."

This can mean that we have some service troops that are not furnishing the service intended and therefore we should get rid of them. Or, it can mean that we can dispense with one or more of the services now being furnished by service troops. Thus, if our quartermaster bakery companies are not in fact providing fresh bread, we should get rid of them. Or, if they are providing fresh bread but it has been decided that the troops do not require fresh bread, then we can get rid of them. Actually, there is no point in saying we have too many service troops. If the service troops are not doing their job, they should be made to do it. If there are too many services being furnished, then that should be stated and the appropriate service eliminated. Once the need for a service is eliminated, the service troops providing it can go.

So, briefly, we must have more supplies (hard-hitting, highly mobile); more dispersion; less area; and less service troops. More supplies require more service troops to handle them. More dispersion means more area or less supplies. Less area means less supplies or less dispersion. The problem is thus impossible of solution. Yet it is nonetheless a problem which needs solving.

How does one solve an impossible problem? The logistician solves it by do-

ing some part of it which is not impossible, and then going on to some other part of it, and so on *ad infinitum*.

Increasing Efficiency

One blow which the logistician can strike at this problem is to get efficiency in his organization. There is hardly a service organization extant which could not do its work more efficiently. As its efficiency increases, its output increases. As its output increases, the necessity for additional similar service organizations decreases. This, then, decreases the number of service troops who in turn require less area and can be further dispersed.

How is this done? It is not done by order. You cannot say, "You service troops start being efficient." Nothing happens. It is done by putting good men in key positions and giving them appropriate authority, support, and hope of reward. It could be done by putting all the good men in service organizations, but then there would be no one left to fight. So, if the good men are going to fight and the misfits are going into service organizations, then the commanders and key staff officers of service organizations must be of correspondingly higher quality. As the quality of the rank and file decreases, the quality of command must increase. Otherwise, efficiency will decrease rather than increase.

In addition to good commanders, the service troops must have a home. They must belong to an outfit which has identity, a normal chain of command, *esprit*, history, and a future. They must have a shoulder patch, if you will—a small thing of immense importance. They must have a company commander who is supervised by a battalion commander and who may some day be promoted to battalion commander or regimental commander. They must have a continuing chain of command concerned with their health, welfare, happiness, and efficiency. They must

go to reviews and be inspected by an officer who is their boss, their "old man." They must belong to a logistical organization suitable to the mission they are charged with performing. No matter what the hue and cry, there will be no efficiency from organizations of misfits, commanded by misfits who have no chance for promotions or increases in pay and who do not "belong." Service troops cannot be justly grouped in little bastard organizations; stuck here and there, unwanted and alone until a dire need for them arises; and then cursed and reviled because they are not crack outfits.

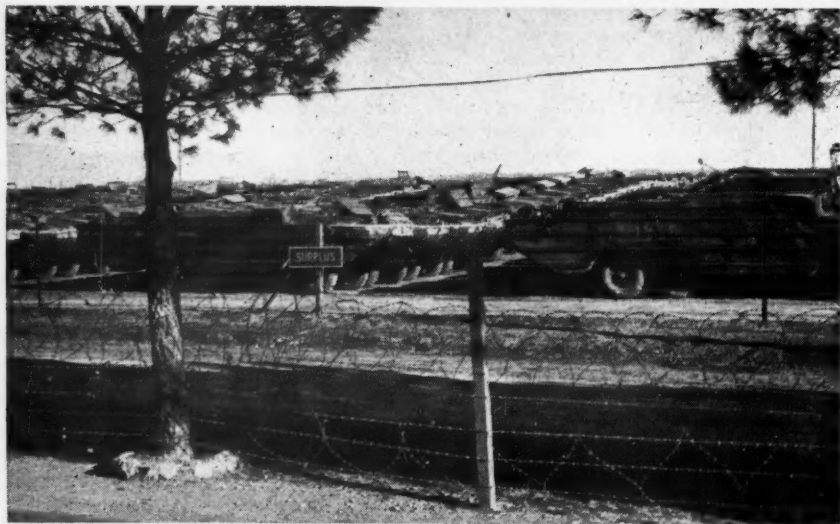
This logistical organization must train as a unit and go on CPX's and field exercises. It must develop SOP's, have critiques, make recommendations, and do all the struggling and floundering that any other organization goes through in developing the lore of its trade. Everyone knows the great glittering principles of war. But between wars, the day-to-day tricks of the trade and the lore so painfully learned in the game of logistics can dissipate and die.

Even with efficient service troops, we have not fully solved the problem of providing more supplies, more dispersion, less area, and less service troops. We have solved some of it, but not all.

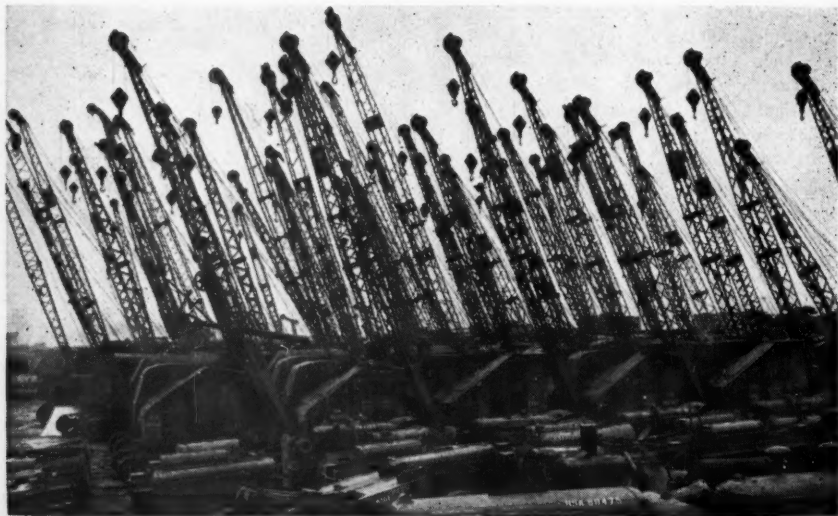
Supply Reserves

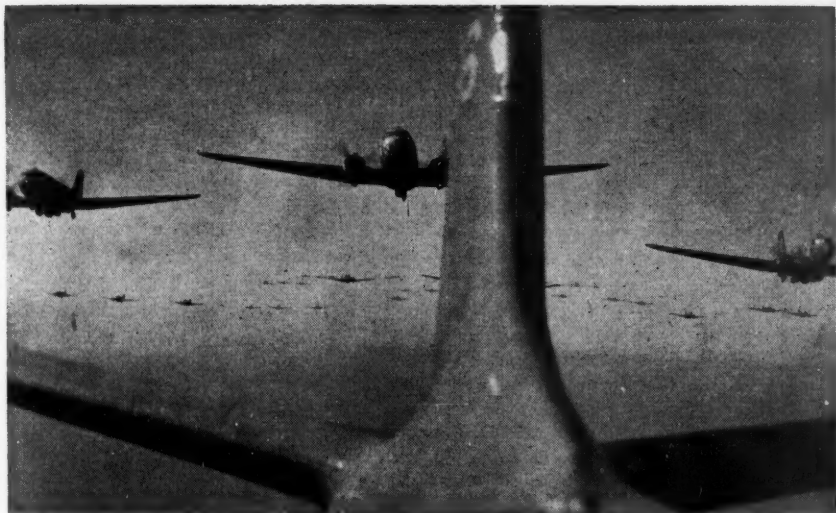
One large unsolved segment of the problem is the question of reserves of supplies. Huge reserves require area for dispersal. They require service troops to disperse them, to handle and store them, and to find and deliver them when needed. They require huge ports to come through, and they require huge resources in men and materials to produce and deliver them.

Why do we have reserves? Why don't we put into the pipeline each day the amount of supplies which the combat



In future warfare, better communications may be the answer to the problem of supply reserves and surpluses. Above, surplus vehicles in an ordnance depot at Leghorn, Italy, in 1945. Below, engineer surplus in another depot at Thatcham, England, awaiting disposition by the Joint Army Navy Liquidation Committee in 1945.—US Army photos.





Above, a flight of C-47s in the airborne invasion of Holland in 1944; in the future, air transport may be called on more than ever to help solve the logistical problem of time. Below, the crowded port of Manila, Philippine Islands, as it appeared in 1945; such concentrations may not be possible under the conditions of future warfare.—US Army photos.



troops will require on the day the supplies arrive.

First, we do not know what the combat man will need tomorrow; nor does he. All plans in war are estimates, not certainties.

To take care of those needs which have not been included in estimates—that is, those which are not flowing in regularly through the pipeline—we must have a reserve in kinds of items and also in numbers of items. Thus, the combat man may unexpectedly want an item for which he has previously had no use, or he may suddenly want more of some item which he has been using right along but now wants to expend at a greater rate. To furnish these items promptly, the logistician must have on hand a reserve stock sufficient to last while the unexpected need of the combat man is being transmitted to the source of the supplies; while the supplies are being located, packed, and sent forward; and while actual delivery to the combat man is being effected.

Also, there must be a reserve to take care of a breakdown in the pipeline. If a ship sinks, there must be enough supplies on hand to last until another ship is loaded and arrives at the point where the first ship sank.

There is no getting away from the necessity for reserves. Reserves will be required as long as wars are fought. However, reserves need not necessarily be in items. A reserve of ammunition may be a stock of ammunition piled upon the ground behind the gun—maybe immediately behind it, maybe 10 miles behind it, maybe 50 miles. It may be something else.

For example, consider the reserve on hand in the case of the pipeline breakdown. Suppose, instead of having a reserve of items at the point of need when the ship sank, we had a reserve of transportation at the point of origin. Suppose, for instance, when the ship sank, we could load duplicates of everything that

was on that ship onto the proper number of aircraft. These aircraft could then take off and arrive at the point of need prior to the time the ship was scheduled to arrive. This is a reserve. It is just as much a reserve as the items stocked at the point of probable need. It is a better reserve, since it exactly replaces the items lost. The items stocked at the point of need are only estimates, since no one knows what ship is going to sink or when. This, then, is dispersion. There are less items occupying the small island. This principle is applicable to more than ships and aircraft. It is also applicable to railroads, trucks, and helicopters. Parenthetically, it may be noted that a reserve of transportation is left over and can be used after the war. Our reserves of items used in World War II are now rusting and rotting throughout the world, of no use to anyone and a waste.

The time required to fill an unexpected need includes time for communication, time for locating the supplies, and time for transportation. If any part of this total time can be reduced, the reserves committed while waiting for delivery can also be reduced.

Thus, we can further substitute for a reserve of items by having a reserve of communication. The communication facilities set aside for logistical purposes is not adequate today, especially in an overseas theater. An increase in this facility would eliminate many items; it would decrease the troops needed to handle the items, decrease the area needed to store the items, and, hence, assist in dispersion. Parenthetically, again, reserves of communication have peacetime uses.

Lastly, a reserve of stock control will replace many items. It is not so much not having what you need. The United States has always had plenty of everything, although it may not have in the future. It is more a question of knowing where the item is and knowing how to get hold of

it quickly. We would need many less items piled on the ground if we knew precisely what we had and where it was.

The logistician then says, "If we want more supplies, more dispersion, less area, and fewer service troops, there are some things we can do."

First, create a logistical organization, closely knit, well-trained, hard-hitting, and from that organization will come logistical efficiency.

Second, create a transportation system which is flexible, rigidly controlled, and integrated, and a proper reserve.

Third, create a communication system of the same caliber.

Fourth, strive for better stock control.

With all these, a small start will have been made toward solving the impossible problem of more supplies, more dispersion, less area, and fewer service troops.

Postscript

The above cerebations came to light as the logistics students of the Command and General Staff College in the 1948-1949 class were wrestling with the problem of providing logistical support to a large-scale airborne operation. The problem concerned an independent corps with normal reinforcements. As this corps was attacked in force and driven back into an area which its three divisions could logically defend, it quickly became apparent that there were too many troops in too small an area. To reduce the number of troops without reducing fire power, it was

necessary to get rid of service troops, vehicles, and large stocks of supplies—all without losing the support provided by these service troops, vehicles, and supplies.

A partial solution for getting rid of service troops was discovered to be in locating them at some distance from the battle area. For example, in this operation, the quartermaster bakery company was located at the base, and bread was flown in daily. This system of having your bread and eating it does not get rid of the organization, but it at least permits dispersion in the immediate battle area.

A step further was to locate all army supply points (corps in this case) at a distance from the battle area and—with a rigidly controlled, fast, flexible, transportation system—to effect unit distribution by means of unit packages properly addressed in each case.

Some thought was given to the advisability of keeping maintenance units out of the immediate battle area and of effecting repair by means of exchange of component assemblies.

From these ideas, it gradually became apparent that being able to get hold of a certain item of supply does not necessarily depend on having it geographically close to the point of need. In logistics, we are not concerned necessarily with distance, but with time. The combat forces do not care how far away something is. What they want to know is how soon they can get it.

The more I see of war, the more I realize that it all depends on administration and transportation. It takes little skill or imagination to see where you would like your army to be and when. It takes much more knowledge and hard work to know where you can place your forces and whether you can maintain them there. A real knowledge of supply and movement factors must be the basis of every leader's plan. Only then can he know how and when to take risks with those factors, and battles and wars are won only by taking risks.

Field Marshal Lord Wavell

Was Russia Close to Defeat?

B. H. Liddell Hart

SINCE Hitler died in the ruins of Berlin, and Stalin has been the dominant figure in Europe, there has been a general tendency to assume that Hitler's invasion of Russia was foredoomed from the outset. His attempted conquest of Russia has been placed in a historical niche alongside Napoleon's and regarded as yet another proverbial example of the folly of "trying to bite off more than one can chew."

No such conclusion, however, emerges from examination of the campaign. The failure of Hitler's gamble was not as certain as it looks now. If it had been better prepared, with mechanized resources superior to those he had available, it might have come off. Even as things were, it was not far from success at the first attempt, and perhaps even at the second.

The truth about the campaign is not easy to reach. The Russians, besides being habitually secretive, are not disposed to shed light on weaknesses that developed. But much about the campaign has been revealed in the evidence of the German generals—even more in their admissions than in their assertions. Moreover, significant points often emerge indirectly from the accounts published on the Russian side.

Lack of German Forces

The first striking point about the 1941

invasion is the relative slenderness of Hitler's forces. Not only was space against him, but numbers—even at the start. He plunged into the immense depths of Russia on 22 June, in face of the knowledge that his forces were fewer than those opposing him, while they were bound to be increasingly outnumbered if the campaign were prolonged. That is an astonishing fact. In terms of numbers and space, his was a gamble against greater odds than any aggressor in modern history has dared.

When Hitler's plan was unfolded to his generals in February 1941, they were disturbed to hear that the Red Army had 155 divisions available in Western Russia, whereas the invading forces could muster only 121. Actually, the German intelligence estimate was a little under the mark.

The Germans had not even equality, let alone superiority, in the number of tanks—although Hitler was counting mainly on these for his chance of victory. General von Thoma, then head of the tank side of the General Staff, told me that the invasion was launched with only 2,434 tanks—excluding the very light ones, which he called "sardine-tins"—whereas Russian reports credited the Germans with 12,000.

The Germans concentrated the bulk of their strength on the sector north of the Pripet Marshes, where the highway to Moscow ran.

By that concentration, Field Marshal von Bock's Army Group there had a slight advantage of numbers. But on the southern front, where Field Marshal von Rundstedt attacked, it was very much otherwise. Field Marshal von Kleist, who led Rundstedt's *panzer* drive here, told me that he had only 600 tanks. In Marshal Budenny's opposing Army Group, there were 2,400.

Quality and Speed

What then was Hitler banking on, since he knew that he faced such adverse odds? First, on a superiority of quality—he reckoned that his generals and troops would enjoy a decisive advantage in skill and organization, benefiting from the experience they had gained in practicing the new *blitzkrieg* tactics against Poland and

longed struggle but gambled on gaining complete victory before the autumn. His generals did not feel happy about this short view.

It has to be recognized that his first calculation was correct—and that it brought his goal in sight. The technical superiority of the German forces was amply demonstrated by the result of the earlier battles.

In less than a week, the *panzer* forces had penetrated to Minsk, 200 miles on the road to Moscow, and masses of Russians had been trapped between the pincers. Although large numbers managed to wriggle out, over a quarter of a million were put in the bag. Before the end of July, the drive had reached Smolensk, only 200 miles from Moscow, and another pincer-maneuver had been

While Germany's defeat in Russia may now appear inevitable, the campaign of 1941-1942 wiped out most of Russia's original armies and the margin by which the nation survived was desperately narrow

France. Second, on his belief that a quick defeat of the opposing armies would produce a political upheaval in Russia and the collapse of Stalin's regime.

Hitler pinned his hopes to a quick success, for he shared his generals' anxiety about the vast space of Russia and was fearful of getting too deep into it before he had wiped out her armies. So he planned to encircle and destroy them as near the frontier as possible. That aim agreed with the view of his senior generals, though Guderian, who was now commanding a *panzer* army in Bock's Army Group, would have preferred to drive through to Moscow as quickly as possible.

Hitler refused to think of what might happen if his plan did not succeed and any large part of the opposing armies should retreat deep into Russia. Accordingly, he made no preparations for a pro-

achieved. Half a million were encircled, though once more a large part eventually escaped. Hitler now decided to try a pincer-maneuver farther south, around Kiev. This time the trap was completely closed, and over 600,000 prisoners were taken. Hitler then switched his efforts northward again, brought off a great encirclement around Vyazma, and made as huge a bag as at Kiev.

Lack of Russian Skill

Only lack of tactical skill or lack of fighting spirit could account for such colossal defeats. But the German generals themselves admit that the Russians fought hard from the outset—and recall, with a shudder, how tough they proved. So the cause must have been lack of skill.

Yet the startling results which the Germans secured by superior skill were

not good enough to attain Hitler's goal. Each of his victories, great as they seemed, was too little or too late for his purpose. That was due partly to factors for which he was inadequately prepared, and partly to his own fumbings—more than to the toughness of the Russians. For the stubbornness which made the Russians so hard to overcome made them easy to encircle.

The first attempted encirclement, near Minsk, was not a complete success as the German pincers did not close in time. The German intelligence had failed to realize how poor the Russian roads were, and the German transport was not designed to cope with such deep mud as they developed when it rained. The second encirclement, near Smolensk, fell short of full success from similar causes.

By that time, Hitler had become anxious about pushing farther while a large part of the Red Army was still unbeaten. He wavered in doubt for several weeks, and then he decided to swing his weight southward and trap the Russian forces on Rundstedt's front. As already remarked, that encirclement succeeded perfectly—but it was late in September before the victory here was complete.

Stopped Before Moscow

Elated by that sweeping victory, Hitler decided to make another bid on the Moscow line, though his generals' doubts were growing. Again the pincer-maneuver ended in a triumphant success, but the end of October had arrived before the Russian masses round Vyazma were put in the bag. Hitler had lost too much time—2 months—through his own hesitation and his Kiev diversion. The autumn rains were already turning the ground into a bog.

The path to Moscow was swept almost clear of defenders, but Russian mud came to Russia's rescue at this critical mo-

ment. The victors at Vyazma were tired, and their wheeled transport floundered in the mud. This slowed down the advance during the crucial days. By the time the Germans reached the Nara River, fresh Russian forces had arrived to hold this defense line, and the Germans were held up.

The German generals wanted to break off the offensive and pull back to a good line where their troops could rest comfortably during the winter. Rundstedt went further and argued that the wise course was to withdraw to Poland and to give up the idea of conquering Russia. But Hitler, like most gamblers, could not resist the temptation to have another try.

So the push was continued, under increasing difficulties and in face of growing opposition. On 2 December, the final effort was made. Some of the attackers actually penetrated into the suburbs of Moscow, but they had shot their bolt and were paralyzed by the icy cold. Hitler's forces were thrown back by the Russian counteroffensive that was now delivered with reserves newly gathered from the interior.

A similar fate befell the German advance in the south. After the triumph at Kiev, Hitler could not resist the temptation to push on there, as well as on the Moscow front, though it meant splitting his effort. The path was swept so clean that before the end of November Kleist's *panzer* forces had driven 400 miles farther to Rostov-on-Don, the gateway to the Caucasus oil fields. But they became stranded in the mud, gasoline supplies could not reach them, and the Russians had time to bring up fresh reserves to stop them.

Russian Defeat Close

Looking back, these results are apt to look inevitable. But, looking deeper, it can be seen that the margin by which

Russian resistance survived was desperately narrow. The bulk of Russia's original armies was wiped out—the most colossal roundup in the history of war. It was touch-and-go whether Stalin could scrape together fresh armies from Russia's immense reservoir of man power to halt Hitler before the keys of Russia were captured. Time was gained, and barely gained, only through the saving combination of the weather, German weakness, and Hitler's erraticness, with Russian toughness and Russian backwardness. The last was perhaps the most decisive factor of all—as will be explained later.

The Germans had to pay an exorbitant price for Hitler's final gamble of 1941. Compelled to stay in exposed positions throughout a terrible winter, for which they were quite unprepared, their sufferings and their wastage were appalling. Neither the Army nor the Air Forces ever fully recovered from the strain.

Nevertheless, even with depleted forces, Hitler came dangerously near achieving in 1942 a goal he had missed in 1941. No longer having sufficient strength to attack along the whole front, he concentrated on the southern part, with the aim of capturing the Caucasus oil, which each side needed if it were to maintain its full mobility. If he could gain it, he might subsequently turn north on to the rear of the immobilized Russian armies that were covering Moscow, or even strike at Russia's new war-industrial base in the Urals. But it was a bigger gamble because, if he became stuck, the flank of this southern drive would be exposed to a counterstroke anywhere along its almost thousand-mile stretch.

The "Weakest Hour"

At the outset, the *blitzkrieg* tactics scored once again—but for the last time. A quick break-through was achieved in the Kursk-Kharkov sector, and then

Kleist's *panzer* army poured like a torrent down the corridor between the Don and Donetz Rivers. Surging through the gateway to the Caucasus, it reached the more westerly oil fields round Maikop in 6 weeks. Russian resistance had crumbled badly, and Kleist met hardly any opposition during the later stage.

This was Russia's weakest hour. Only an installment of her newly raised armies was yet ready for action, and even that was seriously short of equipment. The lack of artillery was such that mortars, brought up on trucks, had largely to serve as a substitute. The tremendous losses of 1941 could not be quickly replaced, hard though the new factories were working. Many of the troops, too, showed a lack of "guts" compared with the year before. Once they were by-passed, they drifted back as homeward-bound fugitives, instead of fighting on stubbornly at the road centers to obstruct the enemy's communications.

Fortunately for Russia, the attackers were also much weaker than in 1941. Hitler tried to fill the gaps with Rumanian, Italian, and Hungarian troops, using them to cover his long flank—and that substitution turned into a fatal liability at the end of the year. It was fortunate for Russia, too, that Hitler split his effort between the Caucasus and Stalingrad.

Germans Worn Down

When Kleist drove on from Maikop towards the main oil fields of the Caucasus, he was first halted by running short of gasoline and then hung up in the mountains, where he met stiffer resistance as well as a stiffer obstacle. In giving me his account, he said: "The forces we met there were local troops, who fought more stubbornly because they were fighting to defend their homes." At the same time, his own forces were progressively drained

in order that Hitler might reinforce the divergent attack on Stalingrad.

Here, the first onset was barely checked, but the resistance hardened with repeated hammering, while the obviousness and directness of the German strokes simplified the Russians' problem in meeting the threat. Hitler could not bear to be defied by the "city of Stalin," and wore down his forces in the prolonged effort to storm it. Meanwhile, the new Russian armies were gathering on the flanks. When winter came, Stalin gave the signal for a counteroffensive, which was shrewdly directed against the troops of Germany's inferior allies. Their collapse and Hitler's obstinacy sealed the fate of the isolated German army at Stalingrad. Following this disaster, the scales of the war turned against Hitler.

Yet it had been touch-and-go in the summer. A little greater impetus might have spread the many local collapses of Russian resistance into a general collapse. Civil as well as military morale was low, especially in Southern Russia, before the inspiring example of defenders of Stalingrad and the Caucasus, and the diminished momentum of the invaders, helped to revive it.

Political Considerations

It is difficult to tell whether there was ground for Hitler's belief in the possibility of a political upheaval in Russia, for signs of anything like that do not emerge in a totalitarian state unless and until the iron surface cracks. It is evident that Hitler overestimated the prospects. But it would also seem that there was often less inclination to resist the invaders than Stalin desired. The stern admonitions that were addressed, and the subsequent punishment administered, to a number of areas told their own tale. They tend to bear out the evidence of the German generals as to the lack of trouble

they had when and where they were allowed to practice a policy of conciliation.

Hitler might have had more success if he had been as ready to try on the velvet glove—as he was in the West. His instinctive tendency to "treat the Russians rough" played into Stalin's hand at a critical period.

Weighing up the military factors, one is led to a startling conclusion. Russia owed her survival more to her continued primitiveness than to all the technical development achieved since the Soviet revolution. That reflection applies not only to the toughness of her people and soldiers—their capacity to endure hardships and carry on under shortages that would have been paralyzing to Western peoples and Western armies. A greater asset still was the primitiveness of the Russian roads. Most of them were no better than sandy tracks. The way they dissolved into bottomless mud, when it rained, did more to check the German invasion than all the Red Army's heroic sacrifices.

"Hitler Might Have Won"

Yet the final reflection remains that Hitler might have won in spite of this heavy handicap, if he had been better prepared. He lost chance after chance because the mobility of the German Army was based on wheels instead of on tracks. Its wheeled transport was repeatedly bogged when the tanks could move on.

Tank forces that had tracked transport could have overrun Russia's vital centers long before the autumn. World War I had shown this need to anyone who used his eyes and his imagination. Britain was the birthplace of the tank, and those of us here who preached the idea of mobile mechanized warfare after 1914-1918 urged that the new model forces should have tracked vehicles throughout.

The German Army went further than the British Army, or any other, in adopt-

ing the idea of fast and deep armored thrusts. It fell short in the vital respect, however, of neglecting to develop such cross-country transport. In brief, the German Army was more modern than any other in 1940-1941, but it missed its goal because it had not yet caught up with ideas that were 20 years old.

Even as things were, Hitler might have got to Moscow in the first summer if he had given the tank forces free rein to drive ahead as Guderian urged. But the senior generals considered this a dangerously unorthodox plan, and Hitler here came down on the side of orthodoxy—thus forfeiting his best chance.

The Campaign of 1941 in the Soviet Union

In the autumn of 1941 after the battle of Vyazma, the Germans stood exhausted but apparently victorious before Moscow. According to Jodl, the General Staff of the armed forces considered that one last energetic push would be sufficient to finish the Soviets. The German High Command had neither envisioned nor planned for a winter campaign. A sudden change in the weather brought disaster. The Red Army defense, a terrific snow-storm, and extremely unseasonable cold in the Christmas week of 1941 precipitated the strategic defeat of the German armed forces. Impatient of all restraint, Hitler publicly announced that he had more faith in his own intuition than in the judgment of his military advisers. He relieved the Commander in Chief of the Army, General von Brauschitsch. It was the turning point of the war.

General of the Army George C. Marshall

They May Not Die— But They Wither Fast

Lieutenant Colonel U. P. Williams, *Field Artillery*
Instructor, Command and General Staff College

“WHEN will I get mine and how bad?” This was one of the main questions in the minds of most combat infantrymen of World War II. To each man in an infantry combat unit, it was not a question of whether he would become a casualty but rather of when and how.

Casualty data from the War indicates that the infantryman's phrasing of his question was not far wrong. For instance, 18 of the 65 United States infantry divisions which saw action in World War II suffered *battle casualties* in numbers exceeding their table of organization strength. Five of the hardest hit divisions had 176 percent battle casualties, while the infantry regiments of these divisions lost at least two and one-half times their strength from battle causes. All statistics quoted in this and in following paragraphs are from preliminary compilations, and therefore must be considered approximate only.

Experience of infantry divisions in the European and Mediterranean Theaters indicates that infantry regiments will suffer total casualties equal to their strength in from 85 to 100 days of combat. This experience also indicates that if infantry rifle battalions are maintained by replacements at authorized strengths, the average battalion *permanent* loss rate for all causes is approximately 36 percent of strength per combat month.

The infantryman's point of view is

quite understandable when these figures are considered in conjunction with two facts: (1) that it was not unusual for infantry divisions to be in continuous action for periods of 120 days or more; and (2) that no effective system was ever instituted for giving individual combat infantrymen an extended or even a temporary period of relief from the front lines.

As far as the average infantryman was concerned, he could get honorable relief from combat only when he became a casualty, or when the War ended. Hope for the War ending was a very faint hope for something in the *dim* and *distant* future.

Figure 1 provides the basic material for this article. It shows what happened during combat to the original members of infantry rifle battalions of the Fifth Army. Experience of infantry battalions has been selected because approximately 82 percent of all Army battle casualties of World War II, excluding Air Forces, were infantry casualties which, if for no other reason than mere volume, gave rise to the Army's major casualty problems. A study of Army casualties is, in effect, a study of infantry casualties. Experience of the Fifth Army has been selected, not because it is an exceptional case (actually casualty rates in some other armies were higher), but because it offers the only presently available compilation of data which shows the effect of combat on

the *original* individuals of infantry units.

The most remarkable thing shown by Figure 1 is the rapidity with which the original members of rifle battalions were *permanently* lost to their units. After 50 days of combat, nearly 50 percent were gone; the battalions were composed of one-half old men and one-half replacements of varying combat experience. Many of the latter were replacing replacements. After 150 combat days, any remnant of the character given the battalions by their original members was merely an inheritance, since only 18 percent of the original members remained. After 300 combat days, only three out of every 100 men who had entered combat with the battalions were left. For all practical purposes, the original battalion members had disappeared. Approximately two-thirds of them had been killed,

manders that battle-inexperienced troops are subject to appreciably higher battle casualty rates than are experienced troops. The abrupt drop in the casualty rate pictures the adaptation of individuals and of units to combat. If the original personnel of units suffer high initial casualties, it is logical to assume that individual replacements who join units during the thick of a fight will be confused and frightened. Lacking any feeling of a bond between themselves and their fellow soldiers, and thus any feeling of group support, they will be ineffective or will suffer at least as high a casualty rate as the original members of the unit experienced in their first days of combat.

Many statements of combat commanders support this contention. One such statement of a division commander is quoted as an example:

To the infantryman of World War II, it was not a question of whether he would become a casualty but rather of when and how. Conservation measures, adopted now, will help to reduce casualties in a future war

wounded, captured, or were missing, while one-third had been lost from disease (including psychiatric disorders), nonbattle injury, and administrative causes.

Battle Losses

A study of the battle loss rate curve provides several interesting points for discussion. During the first 15 days of combat, the battalions were losing from battle causes approximately 26 percent of their strength per month. During the 15 to 25 day period, this rate dropped abruptly to 21 percent of remaining strength per month, where it remained essentially constant until 75 combat days. During the 75 to 300 day combat period, the rate gradually decreased to approximately 10 percent of those left per month.

The relatively high initial rate bears out the many statements of combat com-

"The replacements that did arrive in Okinawa . . . were not in general a success. The main reason was that no one knew them, nor did they know anyone in the division. They had to be suddenly plunged into battle without ever having worked one squad exercise as a team. All replacements were initially put in reserve units and, where possible, these reserve units were moved gradually forward to condition men to battle, yet it was not sufficient. . . .

"On the other hand, we had some replacements who had a few days more to learn their teammates and to train in relatively minor operations who, when properly led in a bitter operation, performed well. There was no lack of courage among many of these who had more opportunity to become conditioned to battle."

The essentially constant rate between

25 and 75 days probably reflects the rate at which battle-tested infantrymen at peak efficiency will suffer casualties. It was the general opinion during World War II that a man reached his peak efficiency during the first 90 days of combat, and that thereafter his efficiency began to fall off. Figure 1 indicates that for all practical purposes he became least vulnerable after approximately 25 days of combat. Since vulnerability can in a sense be accepted as varying inversely with efficiency, he reached his maximum efficiency after 25 days. The battle casualty rate furnished no information as to the time at which deterioration began.

The decreasing battle casualty rate during the 75 to 300 day period means very little in a casualty study. After 75 days of combat, 60 percent of the original force had been lost. Experience indicates that during World War II 60 percent of all infantry battle losses occurred in six military occupational specialties which constituted only 62 percent of infantry strength. Therefore, by the 75th day, a large proportion of the remaining men were in jobs which entailed relatively slight exposure to the causes of battle casualties, and the loss rate should have dropped considerably. For instance, by the 150th day, the rate theoretically should have decreased to less than 10 percent of remaining strength per month. The fact that it dropped only to 16 percent has little meaning due to the great number of factors affecting the rate.

From this brief discussion of battle casualties, we can draw two conclusions. An infantryman's chances of becoming a casualty are greatest during his first 10 to 15 days of combat. This fact has been accepted in at least one study on casualties to mean that every division, when first committed to combat, goes through an inevitable and *expensive* shakedown

period. It is true that a shakedown period is inevitable, but it is not necessarily true that it need be expensive. We will be able to effect savings in man power by using new infantry units in relatively quiet sectors during their combat initiation period. Actually, there is no way of determining the extent of the expected savings, but by exposing individuals to minimum casualty causes during their period of greatest vulnerability, it is possible that up to 200 of the original members of each division might be saved.

The second conclusion is that casualties among combat infantry replacements can be reduced by exposing the replacement to relatively light casualty causes during his most vulnerable period. This can be accomplished by having replacements join their battalions while the battalions are in quiet sectors of the front, in reserve, or in rest areas. Then the replacements must receive some days of training as part of their own small units in active but, as far as possible, restricted operations against the enemy. Combat commanders of World War II almost universally agree that, whenever procedures similar to those described above were adopted for combat indoctrination of replacements, the battle efficiency of replacements greatly improved, and their battle casualty rate decreased considerably. Estimates by commanders indicate that by employing such methods the replacement casualty rate was reduced by approximately 50 percent.

Nonbattle Losses

This discussion of the loss rate for causes other than battle will be limited primarily to a consideration of losses which occurred from neuropsychiatric disorders.

It must be borne in mind that the losses represented by the loss rate curve for causes other than battle, which will be referred to hereafter as *nonbattle losses*, include those losses which occurred be-

LOSSES AND LOSS RATES AMONG THE ORIGINAL MEMBERS OF INFANTRY BATTALIONS IN ITALY

CUMULATIVE LOSS CURVE REPRESENTS PERCENT OF ORIGINAL MEMBERS LOST.

RATE CURVES REPRESENT PERCENT OF REMAINING MEMBERS LOST PER MONTH.

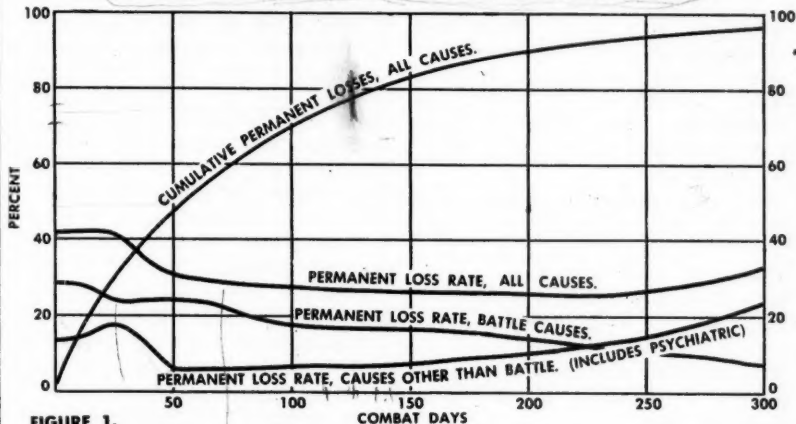


FIGURE 1.

BATTLE CASUALTY AND NEUROPSYCHIATRIC RATES, EUROPEAN THEATER

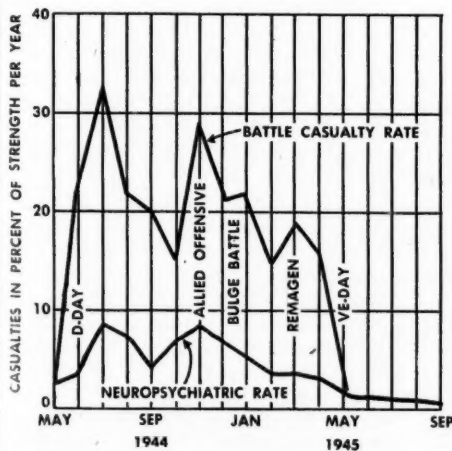


FIGURE 2.

CONSTRUCTION POINTS USED IN FIGURE 2.

MONTH	NP CASUALTIES	BATTLE CASUALTIES
MAY	2.0	0.4
JUNE	3.0	22.0
JULY	8.4	34.0
AUGUST	7.6	21.0
SEPTEMBER	4.0	20.0
OCTOBER	6.7	14.5
NOVEMBER	8.3	28.5
DECEMBER	7.1	21.0
JANUARY	5.3	21.5
FEBRUARY	3.6	13.5
MARCH	3.8	18.5
APRIL	3.2	16.0
MAY	1.5	2.4
JUNE	1.4	
JULY	1.2	
AUGUST	0.9	
SEPTEMBER	0.7	

cause of disease (including psychiatric disorders), nonbattle injury, and administrative causes such as courts-martial convictions and transfers. Although it would be desirable for discussion purposes to have this category broken down into its component parts by specific cause, this is not possible since the data necessary for such a breakdown are not presently available. Nevertheless, by correlating the information from Figure 1 with other available data, it is possible to draw certain conclusions.

A study of the nonbattle loss rate curve discloses that the rate started off at approximately 15 percent per month, had an abrupt rise to 19 percent per month at about 25 days, and then dropped to 6 percent at 50 days. After 50 combat days, the rate rose gradually to 11 percent at 200 days, and then rose more sharply to 24 percent of remaining strength per month at 300 days.

The first point of interest in this curve is the abrupt rise in the loss rate to a peak at approximately 25 days. A study of casualty experience indicates a practically constant rate for permanent loss from disease (less psychiatric disorders) and nonbattle injury during this period; therefore, the abrupt rise in the loss rate must have resulted from high losses in the psychiatric category, the administrative category, or both. A great deal of evidence indicates that unit losses from both neuropsychiatric disorders and from administrative causes reach a peak soon after units enter combat. These losses are generally conceded to fall into three categories.

One category is the group composed of cowards who, though perfectly capable both mentally and physically of remaining with their units, by one device or another removed themselves from the dangers of combat. These usually were lost to their units through courts-martial convictions. Another category is that group of emo-

tionally unstable individuals who, upon being exposed to even minor combat situations, almost immediately become neuropsychiatric casualties. The third category indicates that there is truth in the statement that the first few minutes of combat are the most important to an individual and will determine his value as a soldier. This category is composed of those men with almost normal emotional stability who become neuropsychiatric casualties because their first combat experience was of an exceptionally terrifying nature. If these individuals had been given a more moderate introduction to combat, they probably would have become good soldiers.

Sufficient evidence is available to indicate that probably the entire increase in the nonbattle loss rate can be attributed to the losses from these three categories. In support of this contention, and as an example of the kind of information available, the following is extracted from a report by the Surgeon General on the invasion of France:

"During the first 60 days after D-day, there were roughly 13,000 neuropsychiatric admissions (to hospitals), about 12 percent of all admissions in the First Army. One combat fatigue case appeared for each five wounded. There were almost no cases in the first few days, and then there is said to have been a wave of admissions on the part of men who were unfit for combat and who were then quickly weeded out. Thereafter, patients appeared more or less in response to the intensity of combat, or as divisions were used continuously in line without rest. Many cases appeared among men sent in to replace battle casualties, for these soldiers lacked support of the group feeling which comes with unit training and preparation for combat, and perhaps were not so well trained."

Another statement in the same vein is quoted from Study Number 91 of the

Theater General Board, U. S. Forces, European Theater:

"What, for want of a better name, may be called the 'first type' (of combat exhaustion) occurred among troops in combat for the first time. It usually occurred either just before actual entry into combat or during the first 5 days of combat. The incidence of this type was particularly high among infantry replacements who had not been thoroughly trained for their assigned tasks, and who were not integrated into their unit or indoctrinated with the spirit of the unit prior to the time that they participated in actual combat.

"The 'second type' occurred among the experienced battle-tested veterans who had undergone continuous, prolonged, and severe fighting. It usually began to manifest itself after a period of about 4 months of combat, and the first indications were increased irritability, a loss of interest, decreased efficiency, and carelessness on the part of the individual as to his personal safety."

The second point of interest in the non-battle loss rate is the drop in the rate from 19 percent per month at 25 days to 6 percent at 50 days. Again, a study of casualty data indicates that a large portion of this change resulted from a change in the neuropsychiatric and courts-martial rates. During this period, the weeding out process mentioned in the Surgeon General's report was completed. Those original members of the battalions left after 50 combat days represented a group of men of proved courage who had adjusted themselves emotionally to the dangers of combat.

But despite the fact that the weaklings, and some not so weak, had been weeded out, the loss rate immediately began to rise, and after 200 combat days, it rose very rapidly. This rise took place despite the fact that the greater proportion of remaining personnel was in jobs which

required relatively slight exposure to extreme combat situations and was subject to a lessening battle casualty rate. This is at variance with the experience illustrated in Figure 2, which shows how, until February of 1945, the neuropsychiatric rate in the European Theater varied almost directly with the battle casualty rate.

This same direct relationship between neuropsychiatric and battle casualty rates existed in practically all combat echelons in all combat theaters. Experience shows also that disease rates had a direct relationship to the battle casualty rate. Since the battle casualty rate among the original members of the battalions decreased steadily after 75 combat days, we should expect the nonbattle rate also to decrease. However, other factors must have been at work, since the exact opposite occurred. These other factors are quite clearly described in the following extracted statements.

The statement below appeared in a report of the Surgeon General on the Italian Campaign:

"It was shown conclusively for the first time in the United States Army experience that neuropsychiatric symptoms were chiefly pressure symptoms induced primarily by the emotional stress of combat, and that the question of predicting neuropsychiatric breakdown resolved itself into one of determining *when* a man would break rather than *who* would break under the stress."

The statements below are extracts from an Army Ground Forces study on Army Ground Forces casualties:

"While it is true that the infantry soldier will eventually wear out in combat, it being simply a question of length of time determined by how he is used, the thoughts and feelings of the infantryman at battalion level may provide a key to his more efficient use. First and foremost, the infantryman feels he is hope-

lessly trapped. He wants a 'break.' Under present policy, no man is removed from combat duty until he has become worthless. The infantryman considers this a bitter injustice. . . . He feels that the command does not distinguish between him and the base area soldier, and is actually less concerned for his welfare . . . Considered opinion points emphatically to pride (self-respect) and the strong bond with his fellow soldiers as the essential motivation that keeps a man going. Discipline undoubtedly contributes, as does fear of severity of courts-martial. The larger aspects of 'Why We Fight' mean little to the front-line soldier as a driving force. After some months in combat, however, the infantry rifleman feels he has 'done his share.' Around him are new faces; his old comrades in arms have thinned out to the vanishing point, and the old tie is gone. He has proved his courage. More and more, he feels that it is not a question IF he gets hit but of WHEN and HOW BAD. There is no escape."

A comparison of neuropsychiatric rates of veterans and of replacements in two infantry divisions in Sicily shows that the rate was definitely higher among veterans than among replacements.

From the above, it is quite clear that at least part, and probably a large part, of the increase in the nonbattle casualty rate was due to increase in the neuropsychiatric rate. The infantryman, with long periods of combat both behind and ahead of him, and with slight hope of ever getting out of the front lines with a whole skin, existed under conditions ideal for neuropsychiatric breakdown. And during intensive combat, large numbers of them broke.

The extract from the Army Ground Forces study explains another apparent discrepancy. In Figure 2, we see a marked downward trend of neuropsychiatric rates in the European Theater,

which began at the end of 1944 and continued without major interruption throughout 1945 despite the fact that the first 4 months of 1945 were characterized by high battle casualty rates. This same downward trend of neuropsychiatric rates occurred at about the same time in the Mediterranean Theater during a period of high battle casualties in that theater. The downward trend began in the Western Pacific Theater about the time of VE-day.

The reason for these trends in neuropsychiatric rates during periods of high casualties is fairly obvious. They occurred during periods in which it was evident to the infantryman that he was making major advances toward the War's end. That faint hope for something in the dim and distant future had changed to a belief that the end of fighting was in sight. Now the lot of the infantryman was no longer hopeless; he had a chance of honorable relief.

What are the conclusions to be drawn from this very limited study of casualties? First, it appears that these casualties can be reduced by carefully introducing units and replacements to combat. The introductory methods which will reduce battle casualties should be equally applicable in reducing neuropsychiatric casualties. Proper introduction of personnel to combat promises such over-all man power savings and increases in unit combat efficiency as to make mandatory the development and adoption of measures for achieving it.

Second, a temporary reduction in neuropsychiatric casualties can be effected by giving the combat infantryman short but frequent rehabilitating periods of relief from the exhausting conditions of front-line combat. Such periods of relief can most profitably be given by circulating infantry battalions, regiments, and divisions frequently and regularly between

front-line and reserve employment. Unit and individual rehabilitation can be accomplished while the unit is in reserve.

Third, no appreciable permanent reduction in the neuropsychiatric casualty rate can be obtained by providing only short periods of relief from the front lines. Important man power savings can be achieved only by having each and every combat infantryman believe that an honorable *extended period of relief* from combat awaits him. This will provide the same type of stimulus as the infantryman in World War II gained when he began to believe that the end of the War was in sight. If our system of individual replacement is to be continued, the rotation of *individuals* from the front line to less strenuous and dangerous duty after a stated combat tour offers the only practicable method for providing extended relief for the combat infantryman.

Summary

Certain procedures for reducing battle and neuropsychiatric casualties have been suggested in this article. No case for them, based upon their humanitarian aspects, has been attempted; each and every suggested procedure has as its support the cold logic that by its adoption the Army will save man power. It is a well known fact that we cannot afford to waste man power in any future war; therefore, it behooves us to give serious study to the early formulation and adoption of

Army-wide policies aimed at establishing these conservation measures.

We certainly should not make one of the mistakes made in World War II, when these procedures were refused on the basis that we lacked the man power to support them. Their implementation, although entailing an initial personnel investment, will in the *long run result in an over-all man power saving for the Army.*

We must not repeat another mistake made in World War II when hurried attempts were finally made to institute some of these procedures without first providing that initial personnel investment necessary for their success. Hurred improvisation of personnel conservation programs during wartime probably will not be successful; our peacetime planning must prepare for them.

Preparation for the adoption of these personnel conservation programs must include education of future commanders to insure that they understand the seriousness of the problems involved, the procedures designed for solution of the problems, and the necessity for following these procedures under even the most adverse conditions. Then we must include in each wartime troop basis the units and individuals which commanders will require to carry out the program. Such preparation, *made now*, will go a long way toward reducing battle and neuropsychiatric casualties in any future war.

In the final analysis, America's success in any war—past or future—and its ability to meet an emergency, is dependent on the quality of the young men who serve in the officer and enlisted ranks in the Army and dependent to an equal extent on the training which they receive.

Former Secretary of the Army Kenneth C. Royall

Dispersed—Yet Organized

Lieutenant Colonel Chester F. Allen, *Infantry*
Instructor, Command and General Staff College

The views expressed in this article are the author's and not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THE spectacular ending of World War II with the destruction of two large Japanese cities by atom bombs set the stage for much speculation about the nature of future war.

Professional prophets and spinners of fantasy, with little more than their imagination to offer, exploited the sensational aspects of the atom bomb and alarmed the world with their notions of how terrible and devastating a conflict of the future would be. Some predicted that a future war featuring an improved atom bomb and other mass destruction weapons would annihilate civilization. They presented horrifying visions of a shattered earth being taken over from man by lower forms of animal life. They expounded the concept of "push-button warfare" in which the fighting would be done by personnel at underground control panels, who would dispatch missiles containing the mass destruction agents to any part of the globe. Large armies, navies, and air forces would be obsolete.

There were those at the other extreme who, through faulty analysis or wishful thinking, contended that the atom bomb would have little or no effect on future military operations. Their reasoning gen-

erally was that no nation except the United States had the technical know-how or industrial potential to develop the atom bomb for many years. Even if successfully developed, the prohibitive cost would limit production, and the very few bombs that could be produced would be employed only against selected strategic targets.

Fantastic claims and prophecies regarding new weapons are not strange. The advent of gun powder, the machine gun, the tank, the airplane brought drastic predictions that each would be so effective that no nation would want to or could afford to wage a war. But men studied and analyzed the capabilities of the weapons and found ways of defending themselves against them. Tactics and techniques were modified to meet the effects that these developments had on military operations. These tactics and techniques were then applied in the light of the basic and fundamental principles of war that have been observed by the great military leaders throughout history.

In this discussion, we will follow a similar procedure. We will consider the influence that the atom bomb will have on military operations and develop some conclusions concerning tactics, technique, and methods that will be required to meet this threat in a war of the future. But we must not limit our considerations to the atom bomb alone. Other developments in weapons and equipment will influence

the nature of future military operations, and in many cases these will give assistance in overcoming the problems encountered.

Development Trends

Current trends in the development of weapons and equipment point towards increased speed and mobility in military operations, with lighter weight of equipment and increased effectiveness of fire power. Ground vehicles will feature increased speed and improved cross-country mobility. Personnel carriers may include protection from small arms fire and shell fragments. The capabilities of transport aircraft will be improved through greater carrying capacities and increased ranges. The characteristics of the helicopter make it especially desirable for a variety of

fluenced by the atom bomb and other technological developments, it will be of interest to review several operations of World War II. Figures 1, 2, and 3 show schematically to scale the disposition of forces in three key operations in which the majority of our effort in each theater was concentrated. Superimposed are circles showing the effectiveness at different radii of an atom bomb similar to those used in Japan.

It takes little imagination to visualize the results if our enemies had employed atom bombs against any one of these operations at the opportune time and place.

Future Military Operations

It is quite apparent that military forces and installations must be dispersed to keep losses to a minimum and to avoid

The atom bomb and other new weapons will require great dispersion in a future war, as well as modifications in tactics and technique; but the fundamental principles of war will still remain the same

military uses, and development continues toward increased lift capabilities and improved performance.

In the field of electronics, there is an imposing array of developments. Radar, infra-red, fire control, remote control, and signal communications equipment shows vast improvement over that used in World War II. Television presents a new and interesting field that may be adapted to military operations. Many of these electronic developments are only in the infant stage and their possibilities appear unlimited. They will contribute toward better control, increased effectiveness of fire, improved intelligence, and a general speeding up of operations.

Situations of World War II

Before we explore the nature of military operations in a future war as in-

presenting favorable targets against which an enemy can employ the weapon profitably. Obviously, an enemy will have the same threat to his forces, and he too must disperse.

With this dispersal of forces on both sides, it is apparent that situations will be quite fluid. Speed and flexibility will be mandatory to successful operation in these fluid situations. Where terrain will permit, land offensives will be conducted by fast-moving forces. These operations will be very similar to some of the operations conducted in fluid situations in France and Germany during World War II.

It is visualized, however, that mobility of these forces will not be dependent upon roads and that control and supply methods will be considerably improved. In rugged terrain, the helicopter appears to be a

possible solution to transportation problems.

Airborne and air-transported operations will be depended upon more and more because of their speed and flexibility. They may be employed in conjunction with overland offensives or they may be conducted independently. Large, self-contained airborne forces, independent of surface communications, may be employed to seize strategic areas. The action of these forces must not be limited to a passive defense of the captured ground. Wherever possible, they should involve offensive operations from the airhead to seize key localities or to force a decision.

A major disadvantage to dependence on airborne operations is the prerequisite control of the air necessary for success. The atom bomb should have little effect on airborne operations if proper precautions are taken to avoid concentrations of troops, supplies, and equipment in marshalling areas and in the airhead. However, development of the guided missile as an anti-aircraft weapon could readily become a most difficult obstacle to air movement.

The atom bomb is not an overpowering threat to surface naval fleets. Here, also, it appears that guided missiles would be the most effective weapons against surface ships, unless countermissiles were developed that could be successfully employed to intercept them.

The threat of the atom bomb will not eliminate amphibious operations. However, this type of operation must change considerably in nature, for here again, dispersion, speed, and flexibility are essential. Underwater craft may be employed to transport large numbers of troops and quantities of supplies. The helicopter may prove a valuable means for ship-to-shore movement.

If a proper analysis of the effects of the atom bomb on the various types of operations is made, it appears quite con-

clusively that we can conduct amphibious, airborne, or land operations in a war of the future within the limitations of our means. Our tactics, technique, and methods must be modified considerably to meet the conditions that will result from the dispersal of forces.

Effect on Principles of War

In 1858, J. J. Graham wrote the following in his military classic, *The Art of War*: "The organization and equipment of armies, and the elementary tactics by which their movements in detail are regulated, have undergone successive alterations, corresponding with the advancement of civilization, discoveries in science, and the gradual improvements in the arts of life. The fundamental principles upon which war should be conducted are subject to no such changes; they are immutable; and the testimony of history favors the assumption that the probability of success, or the reverse, in warfare will always be in proportion as these principles have been attended to or neglected in the conception of the plan of operations."

Today, nearly a century later—a century that has witnessed by far the greatest changes in warfare—those words are still true. We are observing and teaching the fundamental principles of which Graham speaks. The principles may be stated differently by other services in our military establishment, or by military services of other nations, but the basic concepts are very similar. Let us review these principles of war to examine their validity in the light of the present and foreseeable technological developments.

1. *The Objective.*—The ultimate objective of war is unchanged. It is the destruction of the enemy's armed forces and his will to fight. The limitations on time and forces available, the greater economic strain, and the danger of mass destruction weapons, make it imperative that intermediate objectives be carefully

selected and clearly defined, and that correct evaluations be made of the forces necessary to attain them. The definition of the objective must be clear at all levels to insure against unnecessarily expending effort on tangential, but not controlling, objectives.

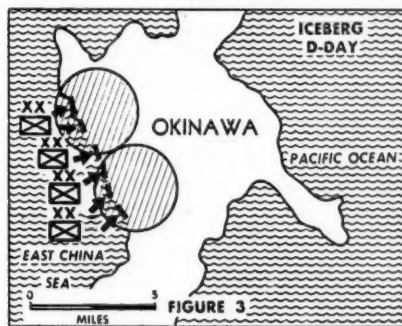
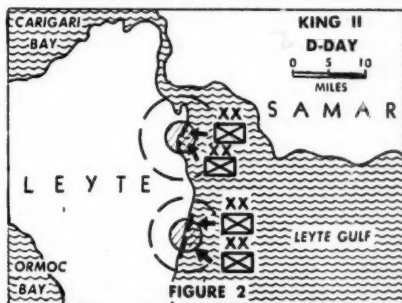
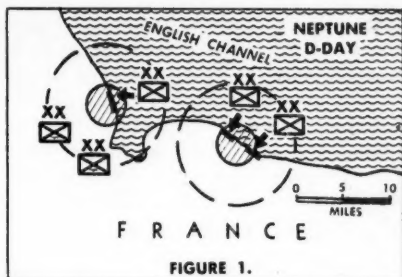
2. *Simplicity.*—In a war where mass destruction weapons are employed, plans may be suddenly changed by the destruction of an entire unit or essential means. Simple plans, easily understood and capable of rapid dissemination, are essential. New and intricate weapons and equipment must not be permitted to complicate our tactics.

3. *Unity of Command.*—The increasingly rapid tempo of modern war requires that co-ordination be achieved before the action is joined. Co-operation between adjacent forces based on complete understanding of the over-all plans and objectives is essential. On broad and fluid fronts, this demands full exploitation of "soft spots" to assist forces held up by strong resistance.

4. *The Offensive.*—The increased range and effectiveness of new weapons, the improved mobility of vehicles, and the developments in signal communications have given the offensive a superiority it never before has enjoyed. Assumption of the initiative and of the offensive-defensive will be of paramount importance in a war of the future. The Maginot Line complex will be relegated to obscurity.

5. *Maneuver.*—Developments now under way indicate far greater speed in the displacement of troops and matériel toward the enemy. Movement must be exploited to the maximum to overcome an enemy's superiority in numbers and mass. With improvements in vehicles and control equipment, mobility will be increased. Increased mobility will permit increased flexibility and more rapid concentration and dispersal of forces.

6. *Mass.*—The importance of mass has



LEGEND

- LANDING BEACHS
- 3,000 YD RADIUS:
CASUALTIES—100%
KILLED—
88% 0 to 1,000 YD
40% 1,000 to 2,000 YD
5% 2,000 to 3,000 YD
- 10,000 YD RADIUS:
CASUALTIES SCATTERED, SERIOUSLY
INJURED TO SUPERFICIAL

not been diminished by modern developments. Rapid concentration of superior forces at the decisive point must be attained. Such concentration has become more difficult and dangerous, but the necessity remains. Concentration must be rapidly executed for an overwhelming decisive blow, after which forces must be rapidly dispersed to a degree necessary for protection from mass destruction weapons.

7. Economy of Forces.—Our foreseeably limited resources, resulting from the increased drain of modern war, make it necessary that every commitment be scrutinized carefully in order that the maximum results can be achieved with the limited means. The acceptance of calculated risks or losses in areas which are not decisive will be mandatory, in order that we may mass our efforts on decisive aspects. Operational flexibility deriving from increased mobility and control will permit more economical and effective use of limited forces.

8. Surprise.—Detection devices and other electronics developments, refinements in aerial photography, and improved performance of reconnaissance aircraft makes surprise relatively more difficult to attain. This is counteracted to some degree, however, by the development of mass destruction weapons in comparatively small packages. These weapons, in turn, make the attainment of surprise in all operations more essential to success. Increased mobility, feints, and maintenance of the initiative will enhance the chances of attaining surprise.

9. Security.—Security measures, both active and passive, will receive additional consideration. Warnings obtained from mechanical devices, or from security forces, are of increased importance. Dispersal forces must emphasize security, since they will be more vulnerable to infiltrations and raids. If dispersal is too

great, the dispersed forces may risk defeat in detail.

It appears quite evident that our fundamental concepts have not been changed by the new technological developments, except in so far as the importance of their observance has been accentuated. As implied earlier in this discussion, the safest conclusion seems to be that we must familiarize ourselves with new developments, determine what changes in tactics and technique may be possible or necessary, and apply them in the light of the fundamental principles.

Tactics and Technique

The developments in the field of physical sciences are not always paralleled by advances in strategy, tactics, and technique. Too often, in former wars, armed forces entered the conflict in a state of outmoded preparation, for they were normally trained on experiences and weapons of the past.

As long as the developments in armaments were slow, the results were rarely disastrous. If both sides were unprepared, the penalty was generally excessive losses in proportion to the results achieved. If one side, only, erred in this respect, the effects were more serious. But even then, advantages of time and space, superior leadership, higher morale of troops, or adoption of proper strategy permitted the weaker to make up for his initial disadvantage.

Today, the situation is different. Technological advances have so reduced time and space factors and increased the potency of weapons that our strategy, tactics, and methods must be critically re-examined and improved where necessary to keep abreast of material advances. In view of our preceding discussion, we can arrive at certain conclusions as to the modifications or changes in tactics and technique that will be necessary to keep

pace with our present and foreseeable technological advances.

Land tactical operations will be characterized by dispersed forces and fluid situations. As a yardstick, it is considered that a tactical unit the size of an infantry regiment or smaller will require no more dispersion than was normal or customary in World War II. Elements of a division, therefore, should be separated, if possible, so that one atomic bomb would not cripple more than one-third of the division. Large forces of troops and equipment will not be concentrated in assembly areas prior to launching an offensive. They will prepare for the offensive in dispersed locations from which they will proceed to the attack and converge upon the objective. Speed and mobility are essential. It is important to note that when tactical forces of both sides are in contact, both will be affected by a mass destruction weapon projected against either.

Wide frontages and greater sectors and zones of operations will be assigned to units. The assignment of general directions of advance to units may be favored over the assignment of zones of responsibility which are strictly defined by designation of boundaries. Where terrain will permit, offensive operations will feature mobile, fast-moving forces, independent of roads, and composed of numerous formations of tanks, infantry on armored personnel carriers, and self-propelled artillery. Islands of enemy resistance will be fixed and by-passed, to be mopped-up by less mobile follow-up units.

Commanders at all levels must provide for strong, mobile reserves capable of immediate employment to meet any contingency. Provision must be made for reconstituting reserves without delay. The reserve assumes new importance in the fluid situation. Security of rear areas will demand more attention. It is not proposed that special units be provided for this purpose, but rather that regular tacti-

cal units should be rotated from front-line duty, thereby becoming part of the reserve of a large unit such as corps or army.

Flexibility will be the keynote in planning at all echelons. In the fluid situations, unexpected developments must be met rapidly. It may be common for units to be cut off and isolated. Helicopter units could be employed, if available to tactical commanders, to relieve, reinforce, supply, or evacuate these isolated units. Helicopters will also be valuable in rugged terrain, in river crossing operations, in supplying rapidly moving columns, or in evacuating casualties. The helicopter is only one example of recently developed equipment that will contribute toward increased speed and flexibility in military operations.

Staging and loading-out operations in preparation for an amphibious assault must be dispersed. Large ports will lose their importance both in loading-out operations and for receiving supplies and equipment in the objective area. Landings will be made on broad fronts with minimum forces. Strong reserves will be afloat, prepared for immediate and speedy landing to exploit a "soft spot." Armor will be landed in early echelons. Mobile forces will advance inland rapidly to seize deep objectives. A much larger beachhead must be secured early in the operation to permit dispersal of forces and installations. Speedier and more satisfactory methods of ship-to-shore movement are under consideration.

The very nature of airborne operations provides adequate dispersion to protect against excessive losses from an attack by a mass destruction weapon. Techniques of air assault operations may require modification if items of equipment now under consideration prove successful.

Developments in armaments and equipment, and trends in tactical operations, demand adjustment in the field of logistics.

Dispersed storage raises problems of logistic organization, not only in connection with the storing, but also with distribution. Service functions will greatly increase and will be subject to interruption. Battle casualties may be more numerous and new types of wounds will be inflicted, requiring development of treatment methods. A rapid and flexible system of evacuation will be required. Because of the required dispersal, logistical operations will be greatly decentralized. Management technique must be more efficient and there must be highly trained logistic forces in being.

Man Power

Man power is more vital in waging war today than it ever was. Warfare requires the same fighting heart, and an even more intelligent application of military knowledge to employ the new weapons and equipment. Man power, therefore, must not be neglected in favor of the so-called "push-button warfare" concept, in which matériel alone is the prime factor in forcing a decision.

Leadership

Superior leadership, planning, and execution will be required in all operations to overcome the problems of dispersion, speed, and flexibility. Leadership, always a vital factor in armies, will increase in importance. The fluid situations with consequent difficulties of control will place more responsibility on junior leaders. Small groups will be more on

their own because of the increased dispersion. The requirements for sound on-the-spot decisions will require the highest degree of judgment. The judgment of one junior officer or enlisted man may determine, in a moment, the fate of an entire unit. Due to the importance of the time element, junior leaders must be well briefed in the situation so they will be able to exercise their initiative intelligently. The resourcefulness required of military personnel will demand the development of good leadership around the integrity of the individual, rather than an ironclad adherence to detailed orders for every situation that might arise. This does not mean the abolition of that high degree of intelligent discipline which is vital to effective teamwork. Confidence and mutual respect must exist between all military leaders, junior and senior.

Preparedness

International agreements may be made prohibiting the employment of atomic, biological, and chemical warfare.

However, under the compelling stress of war, there appears to be no limit to what nations are willing to do in order to win. In the future, the decision to use or not to use these weapons in war will depend on the political and military situation as it exists at the time. Preparation, therefore, must be made to absorb attacks by these weapons with minimum losses to our forces and minimum disruption of military operations.

If the peoples of the world can be persuaded by demonstrated and unmistakable evidence that there is no military threat to their security and their freedom, and that the universal desire for peace is reflected in the actions of all governments, the feeling of inevitable war will disappear. On the other hand, unless some progress in resolving the differences between the two world groupings becomes evident, the tension will tend to gradually increase until the explosion occurs.

General George C. Kenney

The Odds Against You

Major Robert B. Rigg, *General Staff Corps*

WHAT are your chances of winning a battle or campaign when your men are outnumbered? The cold, recorded facts of history indicate that there is about 1 chance in 10. However, these are the odds over the centuries, but within a single war they may be more favorable, depending on the quality and morale of the combatants.

Is God on the side of the heaviest artillery? Numerical superiority normally confers the first right to expect military success, but it is not the firmest foundation upon which to calculate combat success. One-fourth of the 15 decisive battles of the world* have been won by military bodies which were outnumbered. Generalship and the *character* of an army, i.e., its discipline, training, morale, and determination, have outweighed guns many times to win a battle, campaign, or war where the odds favored the more "artilliered" side.

The critic may reply, "Yes, individual excellence could win over numbers in the 'shield and spear wars,' and improved tactics and good generalship could carry inferior numbers to victory in the 'gun-

powder wars,' but what about the modern, 'machine wars'?"

The values have not changed materially. The *character* of an armed force still prevails over numbers.

At the Battle of Marathon, a man wielded a single weapon, and with it he could destroy one opponent at a time. With the introduction of the musket, approximately the same ratio was maintained. A half dozen soldiers handled a clumsy cannon in Napoleon's time, and the effective shot they sent on its way probably neutralized six of the enemy. As artillery methods improved, the killing power per soldier was increased, but more men had to serve the weapon up front and to supply it from the rear. Gradually, there was an increase in the ratio of casualties.

The machine gun almost gave man a true visual index of his multiplied killing power when the tank lessened the MG's effectiveness. In turn, the armored vehicle was off-balanced by mines and anti-tank guns. The airplane out-ranged all weapons; civilian death roles could begin to measure their length with the military, but Douhet's theory of national demoralization failed to hold true. Nations began to count not only their up-front soldiers

* *The Fifteen Decisive Battles of the World* by Sir Edward S. Creasy.

"Past battles against long odds illustrate that there never has been a period in history when numerical superiority always meant victory." Of the 15 "decisive battles," a fourth were won by outnumbered forces

but the rearward ones and the factory workers. War entered its logistical era, but it was the training, discipline, and morale of the combat soldier, sailor, and airman that won final victories.

From Marathon on, there has been no real change in human values. Some men will fight harder; others will surrender. Fire power and air power have become the more accurate yardsticks for material measurements, while the sheer weight of numbers of soldiers assumes less significance than in the past.

Time and circumstance modify the military effectiveness of armies and nations. A national force, victorious in one war, has been known to crumble in defeat in another conflict within the same generation. From out of Asia came the brutally efficient hordes of Genghis Khan and Tamerlane, but these militarized Asiatics were unable to maintain their warlike standard. The armies of France have defeated the military combines of Europe, and in turn France has bowed to defeat before the same foes. Russia, which has enjoyed the advantage of great space when invaded, has sent the conquering Suvorov across the Swiss Alps. But Russia has also fared poorly against tiny Finland and has been defeated by an insignificant Japan.

An invincible army has never been known to exist over any period of time.

Today, in the tense international atmosphere where political ideals clash in the shadow of atom bombs as yet unexploded, there is a tendency among some to discount the lessons of past wars. Modern weapons are not the same as the instruments used at Issus and Fredericksburg; but without will and skill, even the best weapons can be misused, silenced, or abandoned. Science has yet to create an instrument-substitute for human leadership and morale. Until it does, we can learn from the past. It is the human

factor that upsets the advantage of numerical odds.

Therefore, some of the battles and campaigns which were won against the odds of numerical superiority are of interest. These decisive incidents of history range from 490 B.C. to World War II. The victors triumphed because of their offensive spirit and action; none were pure defenders.

Marathon

One hundred thousand cocky and self-confident Persian warriors invaded Greece, which had only 11 thousand soldiers to oppose the throng. But when the weary, sweating Greek spearmen finally rested, they gazed upon the bodies of 6,592 dead. Only 192 of those fallen were Greek. Bravery counted for little as regards the final outcome of this conflict, as both sides were evenly matched in this respect. The Persians unhesitatingly gave their lives rather than forfeit their military fame—and the Greeks matched them—but it was discipline and tactical skill that made the Greek warriors the victors at the Battle of Marathon. The odds were 9 to 1 against the Greeks.

A Juggernaut Put to Panic

Counting camp followers, Darius, the Persian ruler of the next century, had more than a half million followers when Alexander of Macedon's 35,000 soldiers debouched onto the plain of Issus. However, out of this horde, Darius could number about 200,000 real combat soldiers. Even this number proved cumbersome within the confines of the plain upon which the battle slowly developed.

By weight alone, the Persians should have won. The conflict, however, turned against Darius and his legions, but it was a skillful Macedonian assault that finally unnerved him to the point of jumping out of his heavy war chariot to mount

a speedier version, and flee. When he was far enough away to avoid flying arrows and probing spears, he junked his chariot in favor of a horse.

Even in 333 B.C., troops were prone to imitate their leaders. Thousands of Darius' warriors multiplied his panic. A disorganized retreat ensued. The Persian king led his army—backwards. He did not stop for over 100 miles, and then he

species of leader, for near what is now the cliff high city of Erbil (in Iraq) he assembled a military throng variously estimated at 245,000 to 1,100,000 men. Again relying on the equation of numbers over skill, and counting heavily on his elephants and scythe-wheeled chariots, Darius met Alexander. The numerical ratio was 8 to 1 against Alexander.

The Persian cavalry was good, but it

VICTORIES OVER NUMERICAL ODDS

Some of the offensive-type battles or campaigns won by outnumbered forces.

<i>Campaign or Battle</i>	<i>Date</i>	<i>Numerical odds against final victor¹</i>
Marathon ²	490 B.C.	9 to 1
Issus	333 B.C.	6 " 1
Gaugamela (Arbela) ²	331 B.C.	8 " 1
Crecy	1346 A.D.	2 " 1
Poitiers	1356	8 " 5
Tenochtitlan	1522	² 20 " 1
Blenheim ²	1704	6 " 5
Leuthen	1757	8 " 3
Quebec	1759	5 " 3
Torgau	1760	3 " 2
Valmy ²	1792	2 " 1
Napoleon's N. Italy Campaign	1796-7	4 " 1
Auerstadt	1806	2 " 1
New Orleans	1815	8 " 5
Buena Vista	1847	3 " 1
Scott's Mexican Campaign	1847	3 " 1
Fredericksburg	1862	3 " 2
Chancellorsville	1863	2 " 1
Siege of Paris	1870	5 " 2
Tannenberg	1914	2 " 1
Marne	1914	10 " 9
Battle of Britain	1940	2 " 1
1st and 2nd Libyan Campaigns	1940-41	5 " 1
4th Libyan Campaign	1941-42	3 " 2

¹ Based on the approximate numbers involved on each side.

² One of the 15 decisive battles of the world as listed by Creasy.

³ Exact proportion vague; odds may have been greater.

collected 4,000 Greek mercenaries, all that remained of his army.

Alexander's small body of troops won the battle at Issus because it multiplied its shock power by speed and violence. Darius lived to fight another day. Some 2 years later he again opposed Alexander.

Elephants and Scythed Chariots

Despite his cowardice, Darius was a

could not make up for the infantry's lack of excellence.

Using his 200 scythe-wheeled chariots and 15 elephants like tanks to break up the Greek phalanx, Darius poured his cavalry in to widen the breach and turn the flanks. But the Greeks were not as frightened as they might have been. The 30,000 to 47,000 helmeted Greeks showed

unusual tenacity against the Persian numbers.

That day, Alexander merited his reputation as a general. His dispositions were good; his actions quick to relieve the threatened portions of his line. The disciplined Macedonians repaid their general, and Darius fled from the battlefield for the second time when the center of his line collapsed. The Battle of Gaugamela (Arbela) is still a classic example of attack by penetration.

Boldness and Daring

Cortes, the Plunderer, with only a few hundred Spaniards, fought for several years against an enemy numbering hundreds of thousands to win the empire of Mexico for his king. Credit must be given to Cortes' native mistress for saving the entire body of adventurers at one stage, and certainly the Spaniards' horses shared in making the expedition a success.

However, it was boldness and daring that pushed Cortes' Spaniards through sheets of arrows to defeat the Aztec legions between 1519 and 1522. There was little real tactical skill displayed, but the several years of intermittent combat required mental and physical endurance in the face of great odds.

The Capture of Canada

"Ye officers and men will remember what a determined body of soldiers inured to war are capable of doing against five weak bats (battalions) mingled with disorderly peasantry."

Thus read a portion of Wolfe's final orders to his British soldiers and scalpslicing Indians as they prepared for the deceptive assault on the superior numbered French defending Quebec. Half a continent changed hands as a direct result of the military action on the plains of Abraham.

This was not a large engagement as numbers go. Wolfe had 3,100 men in actual

combat against about 5,000 Frenchmen. Stealth and deception placed the British where they could surprise their enemy at 40 yards.

Morale Earns a Victory

"From the cannonade of Valmy may be dated the commencement of that career of victory which carried their (French) armies to Vienna and the Kremlin."*

Outnumbered better than 2 to 1, a raw army of peasants, tradesmen, and artisans of the lower classes of France faced the battle-hardened veterans of Prussia and Austria. The latter were led by the Duke of Brunswick, a soldier whose military reputation was second only to that of Frederick the Great. It was against the solid columns of his infantry and cavalry that the French infantry, at times fearing panic within its own lines, held its ground.

But the Frenchmen were uncertain of their ability as soldiers. At a crucial moment, not a few French artillerymen deserted their guns under fire, and the foot soldiers were prone to waver too. Suddenly, the bravery and enthusiasm of an unhorsed general rallied batteries and battalions. The contagion spread up and down the lines, and from battalion to battalion roared the cry of "*Vive la nation!*"

Seeing his veterans reel backwards, the King of Prussia boiled red with anger and indignation. He tongue-lashed and swore at his men and their hesitancy. He led the core of his toughest men in a counter-attack. Members of his staff lurched shot-ridden to the ground as re-vigored French batteries increased their fire. The French were now determined that they could beat the universally esteemed "best troops in Europe."

That night, as the wounded were sorted from the dead, the French army rested victorious on the heights at Valmy.

* Creasy.

Numerically, the odds had been 2 to 1 against them. Actually they had been even higher, considering the excellence of the enemy.

Odds of 7 to 3

The Battle of Leuthen, which Napoleon termed "a masterpiece of movements, maneuvers, and resolution," was won by Frederick the Great of Prussia, who combined the defeated half of his army with the winning portion to saber the necks of several hundred Croats and Austrians and gain Scheuberg Hill. It was from this vantage point, on terrain he had once maneuvered over, that Frederick inspected his enemy with some leisure and decided that his opponent's 5-mile front was too long.

When Frederick's 36,000 hard-bitten Prussians matched muskets with the 84,000 soldiers of the Austrian Imperial Army, certain weakness in the latter became apparent. The Austrians were poorly generaled and out-maneuvered. Austrian reserves were always plugging the wrong hole.

A cavalry charge and an infantry assault finally broke the Austrian Army's backbone. It fell back. One regiment, covering the retreat that ensued, gave up the fight when its surviving officer discovered that his entire command consisted of eight men.

When Frederick's army halted pursuit at darkness, he galloped about the front and raised four battalions of volunteers which he led into the night. In the confusion, Frederick broke into a castle swarming with enemy officers. Unrecognized, but "on the spot," he had the coolness to ask for a billet. The Austrians gave him a room from which he managed to escape. Word of this episode got back to his main body and stirred the tired multitude to abandon sleep. Singing hymns, the Prussians marched the remainder of that night in pursuit.

The Austrians lost 20,100 men to the Prussians' 6,400.

A Sultan Loses an Army

Had the Turkish Sultan in 1877 taken the recommendation of his victorious general, Osman Pasha, he might have saved his Army and defeated the Imperial Russian Army which then numbered 270,000. Instead, he lost his own Army of 185,000.

With better men but poorer officers than his enemy,* Osman Pasha led his Turks through three defensive battles to defeat the superior Russian forces. The Turks lost one man to every eight lost by the Russians. When Osman Pasha sent his message to the Sultan stating that his position at Plevna was untenable, the casualty score stood at 4,000 Turks to 28,000 Russians. Osman Pasha begged the Sultan for permission to withdraw, but the order from Constantinople was to remain.

The Turkish Army obeyed. It was besieged and starved into an abortive break-through which resulted in disaster. When Osman Pasha handed his scimitar over to his enemy, his Army was a starved skeleton of 40,000. The intervention of the British prevented the Russians from sacking Constantinople.

Larger Forces Misled

A hesitant General Hooker, with an army of 134,000 soldiers, believed that Lee's opposing troops outnumbered his own. Actually, General Lee had only 57,000 soldiers. This miscalculation, or poor intelligence, was one of Hooker's greatest mistakes. Furthermore, Hooker lacked the aggressive spirit which Lee possessed.

The northern general was confused by Lee's sudden attack, and a balloonist's observation report added more to Hooker's bewilderment. Hooker maneuvered, but

* Lieutenants were often over 50 years of age, while generals were as young as 40, due to the peculiar personnel system.—The Author.

he was handicapped by poor roads and thick forests. Lee moved his troops with smart decision, and he then knowingly violated one of Napoleon's maxims by dividing his forces in the presence of the enemy.

In the 4-day Battle of Chancellorsville, Lee mauled Hooker's army distressingly, but Lee regarded the engagement a hollow victory.

A Risk Pays Off

Less than a quarter of a million German troops were about to meet nearly a half million Russians when German General Prittwitz lost his grit. He hesitated to make battle, and the more he thought about the horde of Russians converging on him, the less he liked his chosen profession. We must give Prittwitz credit for some nerve, however, for in the German Army of 1914 it took some resolution for a field commander to recommend a retreat, and this was his recommendation under the circumstances. It cost Prittwitz his command.

The General Staff was shocked, but it did not toy long with a defeatist. It called for out of retirement the obstinate, slow thinking General von Hindenburg. The latter assumed Prittwitz's command with the war-wise Ludendorff as the new chief of staff.

There were two Russian armies, one under Rennenkamp and the other commanded by Samsonof, and each of these were as large as Hindenburg's army. The Mazurian Lakes separated the two Russian forces.

Throwing out a cavalry division to contain the First Russian Army, Hindenburg turned his back and attacked Samsonof. Hindenburg ran great risk of being trapped, but he let Samsonof's Slavs through his center and then closed his own trap on the Russians, who were stumbling about in the forests. Some 60,000 Rus-

sians died on the battlefield, and 100,000 others were taken prisoner.

With Napoleonic ease, Hindenburg then about-faced his thousands and took on Rennenkamp's Cossacks and infantry. Here again, German arms prevailed. By the time another batch (60,000) of Russian prisoners were marched away "for the duration," the Battle of Tannenberg* was already a classic of victory over odds. This is regarded as the most hazardous operation of World War I.

The natural positions ordinarily found can not protect an army against the superiority of a more numerous army, without the aid of art.—Napoleon.

The Conflict of Masses

Visualize 140 miles of entrenched front and shell-pocked terrain with 1,275,000 Germans opposing 1,125,000 Allied troops. This was the setting of one of the most important and decisive events in the history of the world. Because of the millions involved, the First Battle of the Marne is in contrast to the other engagements listed. But like the 1940 Nazi blitz against France, it was an effort to secure a complete victory with a short and decisive campaign.

Why was this giant battle lost by the Germans or won by the Allies?

General William A. Mitchell, in his *World's Military History*, states: "The narrow margin between defeat and victory lay in the failure of Molke to carry out the plan conceived by Schlieffen."

In broad terms, this is true. However, other points should be considered. The Germans had a superiority of 150,000—perhaps a narrow margin considering the weight of numbers involved, but still a margin. Losses were heavier on the Allied side.† At one point, this should have weighed the balance of power in favor of

* More accurately, the battles of Tannenberg and the First Battle of the Mazurian Lakes.—The Author.

† 150,000 Germans to 300,000 Allies according to French sources.—The Author.

the Kaiser's armies. But the Allies turned a German offensive into a retreat.

The average French or British soldier was not encouraged by any knowledge of Moltke's failure to carry out a plan. The French and British won mainly because, on the blood and gore level, their soldiers shot, and got shot—but went forward against odds.

The Battle of Britain

A significant battle against unusual odds, the air conflict known as the Battle of Britain is worth a detailed study.

In terms of aircraft, the Royal Air Force possessed something over 1,000 airplanes against Goering's 2,669. To quote General J. F. C. Fuller,* "These attacks were met by Air Chief Marshal Sir Hugh Dowding, Commanding in Chief, Fighter Command, who had at his disposal 59 fighter squadrons, and who, in spite of the odds against him—seldom less than 2 to 1—inflicted so crushing a defeat on his enemy that never again during the War was an all-out air battle attempted."

The great duel might be termed "science-won," because of the first effective use of radar, but this would be to underrate its heroism and generalship.

As Winston Churchill said:

"The foresight of Air Marshal Dowding in his direction of Fighter Command deserves high praise, but even more remarkable had been the constraint and exact measurement of formidable stresses which had reserved a fighter force in the north through all these long weeks of mortal conflict in the south. We must regard the generalship here shown as an example of genius in the art of war."

The Battle of Britain proved that a war cannot be won by bombardment.

Exaggerated Numbers

Luxury-laden Italian soldiers, compris-

ing nearly 10 divisions (an army of 4 corps), were totally wiped out by British task forces which never exceeded more than two divisions. History records this as the First and Second Libyan Campaigns.

Occupying an all but impossible strategic position in Africa and the Middle East, General* Wavell's combined but scattered units numbered only 78,000 against some 415,000 Italians. The latter blocked Wavell's supply lines and threatened to keep his forces even more divided than they unfortunately were. With hardly the troops to withstand an offensive by the Italian divisions on the Egyptian-Libyan frontier, General Wavell did the unexpected. With a strategy moulded to make one tank look like a company and one man appear to be a dozen, Wavell attacked. He parlayed a seemingly hopeless 5-day raid into a successful 2-month campaign.

It was on a combat patrol level that this operation really began. Instead of intensifying their own patrolling to counter that of the English, the Italian soldiers crouched in their defenses and repeated and enlarged upon the rumors. It was the tempo of British activity that exaggerated their numbers, but rumors helped. Finally, Marshal Balbo was cabling Mussolini for reinforcements. When Balbo was killed, Marshal Graziani inherited the Italian desert command, which outnumbered the British better than 4 to 1.

It was at this point that the "5-day raid" was launched; it ended 2 months later. During that time, the British Desert Army (120 guns, 275 tanks, and 31,000 men) ranged about, and outshot and outmaneuvered the Italians in their "mobile metal coffins." The Royal Air Force and Navy contributed immeasurably

* *The Second World War, 1939-1945.*

* Later, Field Marshal Lord Wavell.

to the eventual success of the English ground army.

For his gamble, General Wavell had to bury 500 of his men, evacuate 1,373 of his wounded, write off a number of his tanks, and list 55 of his soldiers as missing in action. On the credit side, he had taken 130,000 prisoners, captured or destroyed 400 tanks and 1,240 pieces of anti-tank and field artillery.

General Fuller writes, "Thus ended the campaign of many lessons, of which the more outstanding were: that mobility in the attack is superior to mass in the defense . . ." The strategy of exaggerated numbers paid off, but it forced Hitler to send Rommel with reinforcements to Africa.

Surprised by a superior army, an ordinary general, occupying a bad position, seeks safety in retreat; but a great leader will resort to audacity and march to meet his enemy.—Napoleon.

Bold Generalship

The balance of power lay with the Axis desert army when General Rommel's Germans and Italians came within an ace of winning an armored campaign* which involved one of the largest tank versus tank battles of World War II. The order of battle lineup only tells part of the story:

British	Axis
5 infantry divisions	7 infantry divisions
1 armored division	1 armored division
2 tank brigades	2 panzer divisions
1 armored brigade	1 light division
2 brigade groups	—
1 Polish regiment	11 divisions
8 divisions (approx.)	

In addition, the Axis army had air superiority, but the most outstanding tactical difference lay in the ballistic superiority of Rommel's antitank guns and tanks. Greater gun range, larger calibers, better armor penetration, and the thicker armor on the German tanks were other German advantages over

English matériel. In numbers of weapons, each had:

British	Axis
455 tanks	412 tanks
72 AT guns	194 AT guns
527 total	606 total

The heroic defenders of Tobruk had held off twice their strength, and they had done it more as attackers than defenders. Their 4½-month offense-defense set the stage for General Cunningham's attack and the intricate battles that followed.

The campaign progressed with tank losses mounting on both sides, but the Germans were less affected because of their more efficient tank recovery service. After 9 days of fighting, and almost completely whipped by Rommel's forces, the disorganized and shot-up British Army was on the verge of panic. At this point, General Sir Claude Auchinleck flew to the desert. Of this General, Fuller writes: "At this critical moment, an outstanding example of the influence of generalship on operations is presented to us."

Auchinleck refused his troops the false comfort and safety of a retreat, removed General Cunningham from command of the Eighth Army, and placed General N. M. Ritchie in his command post. Much combat action followed. A near defeat was not turned into a victory with ease, but when the battle ended, Rommel's army was forced to withdraw. The famed "Desert Fox" had lost 386 of his 412 tanks, 850 of his 1,000 aircraft, and one-third of his army. The comparative losses in men were: 18,000 British to 24,500 Axis killed and wounded. The English took 36,500 Axis prisoners.

This did not mean that the desert war was finished. It was a victory before a disaster, but the campaign has its lessons, not the least of which is that the side repairing its tanks the quickest has the most reserves.

In the offensive campaign that some-

* The Fourth Libyan Campaign.

time later followed the one just described, Rommel advanced 350 miles in 17 days, without air support. Both of these campaigns illustrate that there is no scientific substitution for generalship and determination.

Retreats always cost more men and material than the most bloody engagements—with this difference, that in a battle the enemy's loss is nearly equal to your own, whereas in a retreat the loss is on your side only.—Napoleon.

Small victories have been won at great costs; conversely, big victories have been secured at small cost. The ratio of your own dead and wounded to your enemy's is not always the foundation upon which to base your next move. Fire power kills, wounds, and demoralizes, but speed in maneuver also can produce casualties in volume.

Battles may be won, but wars lost. It has often been said of the English that they lost all but the last battles. However, England's position in history shows that smaller nations often defeat larger ones or combinations thereof. Britain's population was outnumbered in 1588 when she conquered Spain, and again in 1702 against the French, Spanish, and Bavarians, in the Seven Year's War, and in 1800.

Finland, while it did not *win* the war against Soviet Russia, nevertheless avoided the usual fate of small nations unable to defend themselves. Finland secured a peace not wholly unfavorable to her in the 1939-1940 war of 180 million people against 3½ million. Finland's 3 divisions and 1 cavalry brigade, totaling around 33,000, stood off the Soviet Army of 100 divisions, 9,000 tanks, and 10,000 aircraft—a force of 1,500,000 soldiers. Aircraft and tanks belonging to the Finns were hardly worth counting, but high morale and tactical skill made up in part for mechanical deficiencies.

The aggressor can rarely fight with the dogged determination of his victim.

Like the era when the death of a battlefield commander precipitated a re-

treat, the day when a single decisive blow could decide a major war issue passed with Napoleon. The Japanese gambled on this type action at Pearl Harbor. Sometimes, these lessons are not learned.

Past battles against long odds illustrate that there never has been a period in history when numerical superiority always meant victory. As to size, there are limitations. Generally, you cannot count on completely beating more than about 2½ times your own number, except that today a new set of numerical values must replace the old. On land, it is fire power, and not numbers of men, that should be weighed, for the factor of air power has changed the complexion of war. Air power, like naval power, does not spring from the sheer number of males in a nation. The muscular quantitative can easily be conquered by the mechanical-technical, but will and self-confidence must back quality against quantity or the match will be on an even basis.

The real lessons of past wars lie not in the tactics or forces employed, but in human reactions, greatness born out of circumstances, generalship, the little extra courage needed to turn the odds in your favor, and above all, military and mental preparedness. The military unpreparedness of the United States has bared more chests to bullets than has all the combined heroism and bravery of the world.

Men can fly in the air and float on the ocean, but all must live on the land. It is on the land that the final decisions of any future wars will be decided. There is no national or political monopoly on bravery. A communist soldier will sacrifice his life just as quickly as the democratic soldier—perhaps with less question.

Americans in the past have faced long odds; those of the future may have to win over even greater odds.

Map Supply Must Not Fail

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MAPS are among the most important documents used by military forces. Their value in the planning and conduct of military operations is generally recognized. No less evident and widely acknowledged is the necessity for placing the right map in the hands of the users in time to serve their purpose. In striking contrast, the problem which is involved in achieving this essential distribution is rarely understood, even by high-level planners. As a result, map shortages have been a frequent occurrence in war.

In the Civil War, commanders of both sides were hampered by lack of maps. Napoleon III was a student of our Civil War. Nevertheless, he failed to prepare military maps of his own country. Consequently, during the Franco-Prussian War, he had to issue enemy maps of France to his troops. This lack of foresight contributed to the early defeat of the French forces. On many occasions during World War II, our troops were handicapped by a shortage or lack of adequate maps of the areas in which they were operating.

A Complex Problem

The deficiencies which occurred in map distribution during World War II seem surprising, particularly in view of the many other varied and difficult supply problems which were quite successfully overcome. From a cursory appraisal, map supply appears to be a simple problem. The calculations involved in deter-

mining requirements seems easy. The documents themselves are apparently just another item which should be amenable to the usual procedures for procurement, handling, and distribution.

In actual fact, numerous intangible considerations and recondite possibilities introduce complications which make the mathematics of map supply extremely complex. Experience has repeatedly and conclusively demonstrated that maps cannot be successfully handled in the same manner as other items of supply or as mail. The final report of the Chief Engineer, ETO, from which much of the material for this article has been drawn, makes this significant statement: "Arrangements for an adequate supply of maps proved to be one of the most difficult problems of all. It would appear to a casual observer to be one of the simplest, and therein lies perhaps the greatest danger."

Considerations

Several considerations which indicate that separate handling of maps is required and justified are thoroughly covered in the aforementioned volume. The gist of these factors is given here. Only the particular map sheets which cover the area of interest are of any immediate use to troops. The distribution, therefore, must fit the operational plan like a glove. Changes in tactical plans may not affect other supplies, but they do have an immediate effect on map requirements.

The distribution system must respond instantaneously to such changes, if the required maps are to be provided in time. This sensitivity to the tactical situation demands close command surveillance of map supply. Distribution must be approved through the chain of command. In a mobile situation, detailed issue to individuals and small units is difficult to achieve. The bulk of maps needed to cover any substantial area makes it impractical to supply a unit with maps for any prolonged period of mobile operations. Premature issue of maps not of immediate interest is wasted effort because the maps will probably be lost or discarded; they may be voided by a change in operational plan; and once issued, they can seldom be withdrawn for reissue to another unit. To avoid advertising the commander's intention, secrecy in map

failed. As valuable sources of information concerning the area of operations, maps are intelligence documents. From the distribution standpoint, they must be considered more in the nature of intelligence documents than as items of supply and must be separately handled by an independent system set up exclusively for this purpose. This system is schematically shown in Figure 1. It should be noted that corps, primarily a tactical headquarters, is an integral part of the system. Divisions requisition and draw their maps from corps and not directly from army, as in the case of other supply items.

Responsibilities

The numerous activities connected with map supply are closely interrelated. Responsibility for their execution must be definitely fixed and clearly delineated.

The supply of military maps to combat units is an extremely important function. Factors in the problem are co-ordination with operational planning and a distribution system approved in the chain of command

distribution is frequently essential. Logistical limitations prevent the maintenance of excessive reserves. Hence, map distribution must be carefully controlled to prevent wasteful issue. To insure the embodiment of the considerations involved in map distribution into an effective system, there must be centralized control at tactical headquarters. Map supply must not fail under any circumstances.

A Separate Supply Item

Maps are considered as an item of Engineer Class IV supply. This designation is misleading and creates a false impression concerning map distribution. Classify maps as a Class IV item and, immediately, as a supply problem, it is mentally lumped in with thousands of other such items. Repeated efforts to handle maps as a Class IV item have

These responsibilities are presently assigned as follows:

1. The Assistant Chief of Staff, G-2, General Staff, United States Army, is responsible for mapping and charting activities of the Department of the Army and directs and co-ordinates these activities. He determines requirements and priorities for maps and chart coverage pertinent to planning and operations, and he takes suitable action to meet these requirements and to alert production agencies at the earliest possible time.

2. The Corps of Engineers and the United States Air Force are jointly charged with the preparation of maps whose preparation requires the use of aerial photography.

3. The assistant chief of staff, G-2, of division and larger units, acting under the authority of the commander, prepares

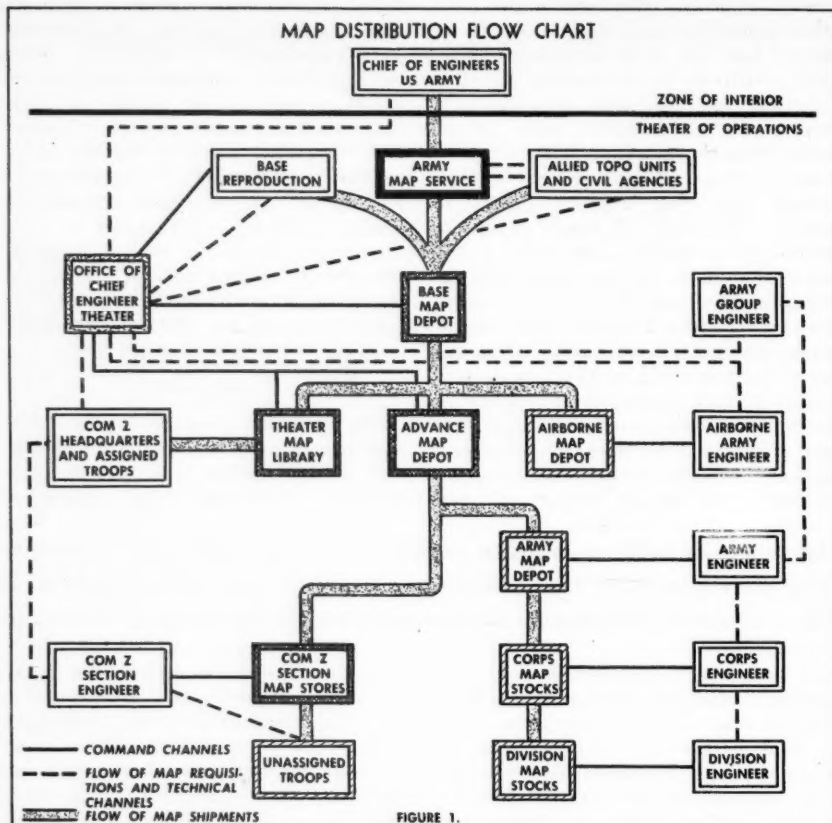


FIGURE 1.

INITIAL ALLOWANCES

	1/500,000 AND SMALLER	1/200,000 ROAD MAP	1/250,000 to 1/50,000 TACTICAL	1/25,000	AERO- CHARTS
ARMY HEADQUARTERS	120	110	120	30	200
CORPS HEADQUARTERS	100	80	180	50	150
AIRBORNE DIVISION HEADQUARTERS	70	90	110	60	40
INFANTRY DIVISION HEADQUARTERS	40	60	130	70	50
REGIMENT HEADQUARTERS	26	20	24	42	104
BATTALION HEADQUARTERS	4	12	18	18	41
COMPANY HEADQUARTERS	2	2	6	5	1
OFFICER	1	0	6	3	1
VEHICLE	0	2	2	0	1
AIRBORNE DIVISION	114	1,112	8,420	2,500	100
ARMORED DIVISION	201	3,800	1,830	1,890	80
INFANTRY DIVISION	80	2,165	1,425	1,180	140

FIGURE 2.

plans and policies and supervises all activities concerning military topographic surveys and maps, including their acquisition, reproduction, and distribution.

4. The engineer of division and larger units is charged with the distribution of military maps under the policies of the commander and the supervision of the unit G-2, except for such maps as may require special distribution. He obtains maps not published by himself from the engineer of the next higher unit.

Terminology

The preceding paragraphs have presented some general aspects of map supply. Their purpose has been to impart an appreciation of a problem which, in the past, has been generally underrated. Before discussing map distribution in the combat zone, a brief reminder of some elementary terms is pertinent.

The scale of military maps is usually designated by a representative fraction which expresses the relation between actual distance on the map and actual distance on the ground. Obviously, $1/25,000$ of something is larger than $1/50,000$ of it. Thus, the larger the denominator of the representative fraction, the smaller the scale.

Tables for determining map requirements and discussions of the subject frequently employ the terms "sheet" and "copy." The technical usage of these two simple words, in map supply, sounds like "double talk." The distinction between the usage of these two terms should be clearly understood. The term *sheet* is used to describe a map of given scale which covers a given area of ground. It is a single piece of paper. The term *copy* designates any exact counterpart or facsimile of a sheet. Physically—as an imprinted piece of paper—a sheet and a copy are identical. The difference, then, is purely a matter of word usage. As used in connection with map requirements,

the term *sheet* conveys the idea of an area or terrain cartographically depicted on a piece of paper. The term *copies* connotes quantity.

Area coverage is the number of sheets of the same scale required to include the piece of terrain being considered.

Initial allowances prescribe the number of copies of map sheets, by type or scale, which can be requisitioned by each organization without further approval.

Distribution in the Combat Zone

Timely planning is necessary to insure that sufficient quantities of suitable maps are available to units, at the time and place needed. Three basic factors which govern such planning are: the area of map coverage, the map scales required, and initial allowances.

The extent of the area of present and projected operations provides the basis for the map coverage required. In general, an actively engaged unit needs map coverage of an area wider than that included within its tactical boundaries. This overlap is required for planning, tactical security, and co-ordination with adjacent units. The number of map sheets at each scale is determined by use of a map index. An outline of the area of which coverage is required is delineated on the index. The included sheets are then counted and listed by appropriate identification symbol. In determining area coverage, the G-2 co-ordinates with the G-3, the engineer, and other staff officers and agencies.

The map scales required are determined according to the needs of the users. These needs are influenced by such factors as the character of the terrain, the type of operations, the nature of the opposition encountered, and the speed of movement. Small-scale maps are used for general planning and strategic studies of higher commanders. Large-scale maps are intended for the technical and tactical needs of the infantry, field artillery, and other



These pictures show some of the processes involved in "placing the right map in the hands of the users in time to serve their purposes." Above, left, US engineers at a post in England, sealing maps to be used in the invasion of Europe, 3 months before D-day. Above, right, engineers checking newly printed maps for errors. Left, men of the 1225th Engineer Battalion sorting and bundling maps for shipment; in 6 months, this battalion distributed 20 million maps to US First Army troops. Below, men of Headquarters, 134th Infantry, 35th Division, preparing maps for distribution near St. Lô, France, on 11 July 1944.—US

Army photos.





Above, US officers examining a situation map of the Italian front, 13 February 1945; left to right, Generals Livesay, Marshall, McNarney, Clark, and Truscott. Below, a platoon leader and three sergeants of the 27th Cavalry Reconnaissance Troop trace the route of a reconnaissance mission in northern Okinawa, 12 July 1945.—US Army photos.



appropriate users. Maps covering the area of present and imminent operations are, in accordance with availability and economy, of as large scale as necessary to provide the detail of information required. Coverage outside the area of immediate interest is of smaller scale.

Initial allowances must furnish units and individuals with a sufficient number of copies of map sheets which provide adequate coverage at each scale required. Difficulties of production and distribution, as well as the weights involved, necessitate economy in map issue. Various factors such as the strength, composition, and functions of a unit are combined with experience data to determine the quantities of maps to be allowed the unit in tables of initial allowances. Figure 2 shows the general form and type of contents of such a table. The quantities shown therein are fictitious.

Determination of Requirements

The actual determination of map requirements can be illustrated by the procedure employed by a field army in calculating the needs of all its subordinate units. The job is done by G-2, G-3, and the army engineer. The G-3 outlines the operational plan. The G-2 and G-3 decide on the types and scales of the maps to be used. The engineer advises on the availability of maps in depots, the capacity of reproduction facilities, and the types and scales which can be most readily reproduced. In accordance with the plan for future tactical operations, the G-2 delineates the projected boundaries of the army and its subordinate units and the over-all area for which coverage is desired. This area will extend far forward of the present lines to allow the time necessary for procurement, production, reproduction, and distribution. The G-2 will also inform the engineer of other factors involved in the scheme of maneuver which are pertinent to map requirements.

With the information obtained from the G-2 and the data contained in experience tables, the engineer is now ready to calculate map requirements for all units of the army and army headquarters. The procedure is as follows:

1. Lay out the projected army area for which coverage is desired on the map index of the scale being considered.

2. In the army area outlined on the map index, delineate the tentative corps and division boundaries. Project these boundaries sufficiently forward to cover the entire area for which map coverage is desired at each scale.

3. List the identifications of the sheets required to cover the area included within the boundaries of each echelon of command from division to army inclusive.

4. From the experience tables, determine the number of copies of each sheet required at each echelon.

5. List the total number of copies of each map sheet required. These are planning figures for initial issue.

Replacement requirements are calculated by applying a percentage factor to the number of copies required for initial issue. The sum of the initial requirement, plus the replacement requirement for each sheet, represents the total number of copies of each sheet which army must be prepared to distribute.

Summary

1. Map supply is a complex problem. Planning for map supply must begin early and be closely co-ordinated with operational planning.

2. Maps are intelligence documents. They must be handled separately by an independent system.

3. Distribution must be approved through the chain of command.

4. The three basic factors which govern map requirements are: the area of map coverage, the map scales required, and initial allowances.

Let's Assume

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CEMETERIES the world over are crowded with the mortal remains of those who assumed unwisely or too much. Here is the headstone of the driver who assumed the other fellow would make a boulevard stop. There lies the man who assumed the pistol wasn't loaded. Can there be any doubt that this ghostly galaxy subscribes unanimously, if somewhat belatedly, to the precept that any course of action based upon a faulty assumption can lead but to disaster? Can anyone deny that many of these unfortunates, if granted readmission to our busy sphere, would never again be so careless as to assume?

There are those among the living who loudly proclaim, "Never assume! Don't take anything for granted!" This concept, fortunately, produces our ablest scientists, researchers, and detectives. Is this, then, the wiser and safer course, or is there a definite need for the making of assumptions?

It is one thing for a person to act upon an assumption when only his own life or fortune is at stake. It is quite another to accept an assumption when the lives and fortunes of others are involved. Such an observation invites a logical chain of questions when one considers that throughout our armed forces, in

peace and war, staff members are formulating plans which will involve the destinies of thousands upon thousands of men and women and billions of dollars worth of property. Do these military planners ever assume? If so, are they justified in assuming? What do they assume and on what do they base their assumptions?

Assumptions for Planning

An assumption, as it relates to military plans, is a premise which is authorized to be accepted as fact in the absence of confirmed information to either guide or to form the basis for planning. At the strategic level, planning assumptions fall into two main categories. First, there are "basic assumptions" which serve to guide the over-all planning effort. An assumption that country "A" will declare war against the United States is an example of a basic assumption. This assumption establishes a priority which permits the entire planning effort to be immediately directed against country "A." That country "A" will initially attempt to seize the petroleum installations in country "B" illustrates a "special assumption," which is the second category. Thus, the special assumption serves to guide a particular phase of the over-all planning.

In an age of supersonic warfare, strategic war plans must meet any eventuality. These plans must be based on specific situations and assumptions about our enemies, our allies, and our own capabilities

It is clear, therefore, that planning assumptions are employed to construct, as nearly as possible, a probable future situation.

Planning assumptions are not necessarily restricted in application to potential enemies but may also be employed in respect to potential allies or to our own situation at a future date. Planners may be authorized to employ the assumption that countries "X," "Y," and "Z" will combine forces with the United States to resist any invasion of the Western Hemisphere, but will not participate initially in any overseas operations. The assumption that, upon the outbreak of hostilities, our bases at "Blue" and "Green" will be immediately evacuated is applicable to our own future situation.

Purpose of Assumptions

These definitions and illustrations of military planning assumptions lead next to a consideration of the purposes of, or the results obtained from employing, such assumptions. First, the employment of assumptions increases the range of military planning. The strategic planners for any nation's armed forces seek assumptions as the starting point for the formulation of strategic war plans. Therefore, that agency at the national level which directs the planning must authorize these assumptions.

Obviously, military planning assumptions must be co-ordinated and approved by some central authority. Without such control, the planning of the various military services at all levels would lack co-ordination and continuity. The Departments of the Army and the Navy, if permitted to act upon their own intelligence and information resources, would quite conceivably arrive at many disputable or contradictory assumptions. Or they might arrive at the same assumption at widely separated times.

However, the Joint Chiefs of Staff,

possessing intelligence and information from all sources, is in a position to reconcile these differences and to announce the assumptions to be employed in the planning of all the military departments. The military planners must prepare long-, medium-, and short-range plans to meet all probable contingencies. These plans, to be concrete and workable, must be based upon situations which may be expected to exist at some future date.

Only through the employment of planning assumptions can these future situations be developed. Not only at the national level, but also in the active theater of operations, planning assumptions assist in the earlier development of operational and administrative plans.

The use of planning assumptions provides direction to the planning effort and thereby enhances the effectiveness of the plan. Lacking any basic or special planning assumptions, our strategic level military planners would conceivably be required to prepare plans to attack or defend against every foreign nation, employing our military capabilities as they exist at the present time. Furthermore, this planning would perforce be of a general nature. Administrative and operational details could not be worked into the plan until after the situation began to develop, and then only after extensive and time-consuming effort to secure intelligence concerning the enemy and to establish definite assurances regarding our own resources and capabilities. Through the employment of assumptions, a more definite enemy and friendly situation is furnished to our planners in time for all planning to proceed at once in the same direction and in the same degree of detail.

Planning assumptions seek to minimize the number of subsequent changes in military plans. If assumptions are employed at the start, plans need only be modified to the extent that the actual situation

differs from the assumed situation. If the assumptions were soundly based, little or no change is required in the plan before it is implemented. If no assumptions were employed by our planners, all military plans would require revision with each change in the enemy, potential enemy, or friendly situation. Many times the preparation of new plans would be necessitated.

Planning assumptions, to a large degree, determine the extent of planning necessary and the number of plans which must be prepared. In planning for future military operations, it is generally impossible to select that one course of action which the enemy or potential enemy will adopt. True, it is possible to analyze the courses of action open to him and to arrange these courses of action in the order in which he is most likely to adopt them. This procedure establishes an order of priority for our planning. The same is true in estimating enemy resources and our own resources and capabilities.

Inasmuch as our planners must be prepared for any contingency, it is generally necessary to construct more than one future situation upon which to base a plan. For example, it may be plausible to authorize three assumptions simultaneously; one, that country "A" will initiate hostile action against the United States in 1950; second, in 1955; and third, in 1960. This would necessitate the preparation of three separate and distinct plans, each dependent upon estimated enemy and friendly capabilities in those years. Obviously, separate plans must be prepared on assumptions that the enemy will attack us from the east, or the north, or another direction.

While it should be clear that the number of plans and the extent of planning must increase with the number of unrelated assumptions, it should also be noted that, if we possess reliable intelligence and information, fewer assumptions are

necessary. Our knowledge that an enemy will be incapable of following certain courses of action enables us to rule out those courses of action as planning assumptions.

An understanding of the justification for and the employment of military planning assumptions is facilitated by a study of the various courses from which these assumptions evolve. This is best accomplished by classifying each type of assumption according to its basis and illustrating each type by means of an historical or hypothetical example. Before proceeding, however, let it be known that assumptions for planning at both the strategic level and the tactical level may evolve from each of the bases enumerated.

Intelligence Assumptions

First, let us consider that category which includes assumptions based upon intelligence. At the strategic level, these may concern an actual or potential enemy or ally. At the tactical level, they will generally concern the enemy.

To illustrate this classification, let us suppose that our top-level intelligence agencies have assembled considerable intelligence on country "A," whose current activities mark her as our most probable enemy. Among other conclusions, our intelligence predicts that "A" will possess by 1951 a strong guided missile capability with ranges up to 1,000 miles. This conclusion has resulted from thorough analysis and integration of many reliable reports from credible sources. Our ranking military and government leaders believe this prediction sufficiently justified to warrant its use as a planning assumption.

Therefore, the Joint Chiefs of Staff would authorize a planning assumption for all the services that country "A," by early 1951, will be capable of employing guided missiles with ranges up to 1,000 miles. Such an assumption will, in many

ways, influence the strategic war plans of each of the military departments. Key mobilization installations, for both personnel and matériel, must be located with a consideration for the range of "A's" guided missiles. Naval bases and marshalling areas must likewise be selected. Dispersion of logistical facilities to support operations must be contemplated. These are but a few of the effects of one assumption, based upon intelligence, on the over-all planning effort. Intelligence concerning the enemy provides the basis for assumptions to guide campaign and battle plans as well as strategic war plans.

Our Own Capabilities

A second type of assumption based on intelligence includes assumptions which are based upon information or reasonable assurances concerning our own capabilities or available resources. Members of Congress may, for example, assure the Joint Chiefs of Staff that the military budget for the next fiscal year will be adequate to support an army striking force of 30 divisions. Acting upon this reasonable assurance, the Joint Chiefs may authorize the Department of the Army to assume a 30-division striking force in its planning. The Air Force, in its long-range planning, might assume, if current research and development warrants, that by 1955 we will have long-range bombers with a radius of 2,500 miles and capable of transporting a 40,000-pound bomb load. A theater commander, acting upon estimates from theater navy headquarters, might authorize the task force commander to assume that adequate landing craft will be made available to him by D-20.

Logical Reasoning

Next, let us consider those assumptions which are based solely upon logical reasoning or upon a combination of reasoning and intelligence. Again invading the realm of supposition, we will presume that

the Intelligence Bureau of a friendly nation estimates that the Communist Party has a plan for disrupting the nation's mobilization machinery in the event of war with any communist state. Furthermore, the Bureau's intelligence reveals that the communists are capable of implementing such a plan. As near as can be learned, the plan contemplates the crippling, by strike and sabotage, of the nation's transportation system. The implementation of this plan, in part or in full, would paralyze the military and economic mobilization of the nation, as well as impede her immediate tactical mobility.

Aside from the fact that intelligence produced by the Bureau has led to these conclusions regarding communist capabilities and intentions, logical reasoning alone would lead one to the same conclusions. The announced policies of the party, statements of party leaders, and usual party operating methods point to the same prediction. Consequently, war plans of the nation, whether they be offensive or defensive, long-, medium-, or short-range, must be guided by the assumption that on or before M-day the communists will launch their operation. As a result, all plans would have to provide for early employment of forces to protect and operate vital transportation facilities. Upon reflection, this illustrative example may be closer to fact than fancy, in the case of some nations.

World War II produced a notable example of planning assumptions based upon logical reasoning. Allied leaders late in 1943 became increasingly aware that German reverses were placing the Nazi high command in a critical position. This development pointed up a possible need for a plan of operation before 1 May 1944, the original target date for Operation *Overlord*. These German reverses included serious losses on the Soviet front, alarming Allied gains in Italy, strong partisan developments in the Balkans, the set-back

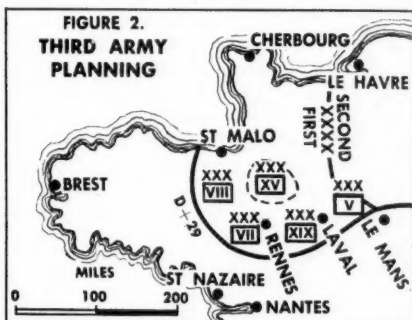
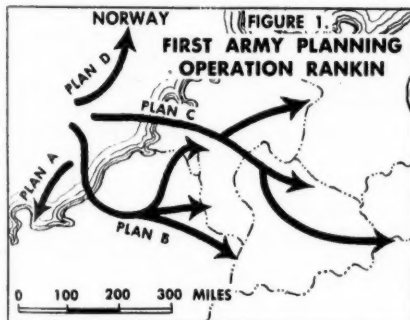
suffered by the U-boat campaign, and the increasing and devastating Allied air offensive over Germany. Our leaders believed that these developments could very possibly cause the German high command to make one of three decisions; first, reduce the existing forces in France, the lowland countries, Denmark, and Norway, in order to gain reinforcements for Italy and the Balkans; second, abandon occupation of Western and Southern Europe to meet the threat of disaster on the Eastern Front; and, third, to negotiate with Anglo-American leaders in order to ensure the ultimate occupation of Germany by forces other than those of the USSR.

Each of these decisions became an au-

they could retreat to positions behind the Siegfried Line. Rankin C was prepared on the assumption of an unconditional German surrender and a cessation of organized resistance in Northwest Europe. Plan D, which called for an invasion of Norway, was later initiated as an alternate plan for Operation Overlord in the event the latter should prove unfeasible. Although none of the Rankin plans were ever implemented and the assumptions proved to be in error, there is no denying that common sense, logic, and caution directed these preparations.

Forecast of Operations

A fourth classification includes those



thorized assumption, and the Chief of Staff to the Supreme Allied Commander directed First Army to prepare plans based on each of these three assumptions. In compliance with this directive, First Army prepared three plans, known as Rankin Plans A, B, and C (see Figure 1). Rankin A was based on the assumption that German defenses in the Operation Overlord assault area would become so weakened prior to 1 May that Allied forces then available would attempt a lodgement in the Normandy area.

Rankin Plan B, contemplating a rapid German withdrawal from Western and Southern Europe, provided for rapid pursuit to cut off the enemy forces before

assumptions based upon a forecast of operations. Here again, we may draw upon an historical example from World War II. As its part in Operation Overlord, General Patton's Third Army was given the mission of driving westward out of the beachhead and clearing the enemy from the Brittany Peninsula. The concept of this operation provided that Third Army, when it concentrated on the beachhead, would assume command of VIII Corps, already in contact, and XV Corps, which would be assembled east of St. Malo. It was necessary, therefore, that the Third Army staff be authorized, as a basis for its planning, an assumption regarding the situation which would most probably ob-

tain on D+29. Figure 2 shows the assumption which was employed with respect to the situation on D+29. This assumption included the probable line of contact and the approximate locations of the various corps in the beachhead.

Third Army prepared three operation plans, each predicated upon this assumption. Unfortunately, this forecast was considerably in error. As one officer expressed it, units in the beachhead could practically smell the salt air of the English Channel over their shoulders, not only on D+29 but also on D+40. However, when Third Army finally launched its operation, one of the three original plans was employed after only minor modification.

It may be argued that assumptions based upon forecasts of operations rightfully belong in one of the categories already discussed. However, a forecast of operations evolves from an analysis of intelligence concerning enemy capabilities, knowledge of our own resources and capabilities, a bit of logical reasoning, and possibly a touch of pure conjecture. Since it does not fall smoothly into place in any of the previously considered classifications, we have simply bowed to convenience in isolating this species of assumption.

Necessity

A final type of military planning assumption which demands notice includes those assumptions based upon nothing other than necessity. Frequently, our top military planning staffs must adopt an assumption in its purest form. Lacking intelligence or established fact upon which to develop logical reasoning, possible future situations must be established without any basis whatever in order to allow planning to proceed. For example, both mobilization plans and strategic war plans must be predicated upon an assumption regarding the time to be available

between the day mobilization commences and the day our forces actually meet those of the enemy. Neither intelligence nor any other source can supply the basis for such a prediction. Therefore, caution dictates the preparation of several plans, guided by such assumptions as these; that M-day will precede D-day by 180 days; that M-day will precede D-day by 90 days; that M-day and D-day will be simultaneous.

We may reasonably conclude that an assumption, at best, is of a speculative nature—a prediction that some particular situation will exist at some future date. It is obvious that the soundness of an assumption depends entirely upon the accuracy of the intelligence or information or the logic of the reasoning upon which it is based. To those who contend that speculation is quicksand under the foundation of military planning, we reply that without assumptions military planning can have no direction and no time cushion.

In an age of supersonic weapons and machines which minimize the security formerly afforded by time and space barriers, strategic war plans must meet the needs of any eventuality in the near or distant future. These plans must be based upon specific situations if they are to be concrete and capable of rapid execution. These specific situations as they relate to potential enemies and allies and to our own capabilities must be constructed upon assumptions.

To forestall any accusation that our military planners are gambling with lives and property in assuming such situations, it should be pointed out that only the plan and not the action is based upon the assumption. When a situation arises which differs from those for which our plans were prepared, then we need only to modify that plan which most closely fits the situation. Such a development is not only possible but probable. Experience has

proved that the modification of a completed plan requires far less time than the preparation of an entirely new plan.

It follows, naturally, that if the intelligence, information, or reasoning upon which our assumptions were based is accurate in all respects, the situation will develop exactly as we assumed it would and little or no revision of our plans will be necessary. Thus, when our plan is

finally implemented, when men and matériel are committed to action, most, if not all, of the element of speculation will have been removed. Military plans based upon sound assumptions enable the commander to meet the enemy at least half way. And in the final analysis, can we not safely say that, since the assumption gives presence to the eventuality, it is synonymous with precaution?

Our military planners are skilled in the art and science of warfare, and in their assumptions work on the premise that those likely to be on the other side may be just as smart, just as calculating, just as capable of making right decisions as we are.

Secretary of Defense Louis Johnson

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Effective Military Administration

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EFFECTIVE administration in the higher command levels of the Army depends on qualities of leadership. Many of these qualities of leadership can be developed by understanding the conditions under which people perform most effectively. In this article, the conditions of effective performance are outlined as they pertain to administrative organization and personal relationships.*

Administrative Organization

One of the first problems with which a military administrator may be concerned is the type of organization chart he should develop in order to accomplish his mission. This problem arises whenever an officer is assigned an administrative mission which is not covered by any prescribed organization. This problem arose many times in World War II and proved difficult for those officers who had always served within the limits of prescribed administrative organizations. It is thus pertinent here to discuss some of the psychological principles which can be of assistance in developing an organization.

Each participant should have definite duties.—We are here discussing those situations in which the size of the mis-

sion is so great that the administrator cannot accomplish the job by himself, and cannot even keep himself informed on all of its many aspects. It is therefore necessary that the administrator divide the mission into goals and assign the goals to sub-administrators.

The assignment of definite goals to sub-administrators involves the application of the psychological principle that effective performance of duties demands that each participant know exactly what is expected of him.

Jobs-sections and divisions should be composed of common functions.—The division of the mission into goals should be based on careful study. Accomplishment of the mission requires the execution of certain work functions. These work functions fall into groups, in the sense that the component functions of any one group are interrelated. Personnel performing these duties must co-ordinate closely with each other. The component work functions of any one group are relatively independent of those of other groups. Little co-ordination is required between personnel performing duties of different groups.

The division of the mission into goals should be accomplished in such a way that each goal represents a group of interdependent work functions. The consideration of personnel administration and classification responsibilities as a

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mission in a unit responsible for rapid and continuous processing of personnel will serve to illustrate this point. One possible division would be to have a personnel administration section and a classification section. Each section would handle its particular responsibilities as they pertain to both officers and enlisted men. An alternative division would be to have an officer section and an enlisted section. Each section would handle personnel administration and classification functions; one section as they pertain to officers and the other as they pertain to enlisted men. A comparative study of these two alternative divisions reveals that soldiers on duty in the officer section could operate satisfactorily with little reference to soldiers on duty in the enlisted section. The duties of the officer section represent one group of interre-

co-ordination delays a person in carrying out his own duties.

2. It lessens the chances for personality frictions. Such frictions usually occur when someone fails to co-ordinate, or when co-ordination is unnecessarily burdensome.

3. Personality frictions result from the social and environmental situation as well as the particular individuals involved.

4. Each sub-administrator has the maximum amount of autonomy possible within a military organization. Practically all his dealings are with his immediate superior or his immediate subordinates.

Work functions requiring similar human characteristics should be assembled into jobs.—There is another principle that should not be overlooked when assembling work functions into jobs. Some work

The success of a military administrator depends on leadership and organization. He must develop good personal relationships; define goals; and encourage responsibility, initiative, and determination

lated work functions, those of the enlisted section another group of interrelated work functions; and little co-ordination is required between the two sections. This condition is just the opposite in the case where there is a personnel administration section and a classification section. The soldiers on duty in these two sections must be continually communicating with one another in order to function satisfactorily; the two latter sections do not represent two independent groups of interrelated work functions.

The division of the mission into goals, represented by relatively independent work clusters, as proposed above, is considered desirable for the following reasons:

1. It minimizes the amount of co-ordination needed. Continued co-operation is difficult to insure when a great deal of co-ordination is necessary and when such

functions require more intelligence for their performance than do others. Other things being equal, only those functions which require approximately the same level of intelligence should be assembled into a given job. The most complicated job function, even though it requires but a few minutes per day or week, sets the limit of intelligence that the occupant must exceed or equal. If this principle is not followed, the result is considerable waste of intelligence.

The principle just outlined is but one application of the broader psychological principle that the characteristics of humans must be taken into consideration in the assignment of work functions into jobs, if maximum proficiency is to be attained. In this connection, it should be remembered that some work functions are much more boring and fatiguing than others.

On the other hand, some work functions tend to serve as relief from others. Do not assign all the boring functions to one job. Other things being equal, try to intermix the functions so that each individual will derive maximum satisfaction from his work and so that each will work with maximum motivation. If personnel are to be effectively selected for jobs, then jobs must be built with a consideration of the characteristics of the men.

It is interesting to note that this principle applies to building machines for use by man as well as to assembling administrative functions into jobs. Much psychological research was done in World War II, and is continuing both in industry and in the armed services, to determine just what characteristics any machine must have in order that it can be most effectively operated by man.

Effective subordinate functioning depends on effective organization and functioning of the larger component.—The administrator, unless he is charged with a small and minor mission, will find it advisable to delegate to sub-administrators all of the duties contained in the mission. This will leave the administrator free to discharge the responsibilities of general supervision, to co-ordinate with equivalent administrative levels, and to report to and receive directives from his immediate superior. It also insures smooth functioning even in those emergency situations when the administrator is suddenly removed.

General supervision should include:

1. A review of nonroutine work submitted to higher authority.
2. A review of the assignments of incoming nonroutine tasks to sub-administrators in order to assure that the original division into sub-missions is followed or revised when appropriate.
3. A continual review of personnel allotments to the subdivisions, in order

to maintain equivalent work loads for all concerned as the amount of work charged to the subdivision fluctuates.

4. Inspection of the accomplishments of sub-administrators.

These four duties are of great importance. If they are not effectively discharged at all times, the administrative organization is throttled. This means that the sub-administrators, all the way down the line to the lowest individuals, are inhibited in the performance of their duties. They become frustrated. Emotional reactions arise and personality difficulties ensue to the end that motivation is decreased and achievement is reduced. In other words, effective subordinate functioning is dependent upon efficient organization and functioning of the larger component.

If the administrator follows the plan of office organization outlined here, he will usually discover that from four to six is the appropriate number of sub-administrators for his immediate supervision. With a greater number of immediate sub-administrators, he neglects some of his important responsibilities, and his entire organization lets down in achievement.

Office Space

Having attempted to so organize the functional aspects of the office to insure wholesome relationships between personalities, the administrator can further the realization of the desired ends by an appropriate distribution of office space. This statement is based on the assumption that desired co-operation is more likely to ensue if it is made easy, the parties concerned are friends, and each appreciates the problems of the others. It is believed that these conditions are usually achieved if the sub-administrators are placed in the same office or in adjoining offices, and if communication between them is readily available at all times.

Personality Frictions

This suggested organization tends to facilitate smooth operation because it decreases the chances for personality frictions by lessening the possibilities for misunderstandings and frustrations. It charges the administrator primarily with the job of making the organization function properly. This enables him to foresee possible personality difficulties before they arise and to act to correct them before they become serious. Personality frictions develop gradually and can be much more readily corrected in the beginning.

Having organized the office, both from the point of view of space assignments and functional responsibilities, there remain to be considered the problems of the relationships of the administrator with his sub-administrators, his co-administrators, and his superior.

Relationship to Superior

The significance of the relationship of the administrator with his superior is realized, in part, when one recalls that in military life a soldier is responsible to his superior for practically everything he does or fails to do. It is, therefore, incumbent upon a military administrator to build a wholesome relationship between himself and his superior. In order to achieve this end, he should learn the details of his superior's personality. He should listen attentively to everything he says. He should study his motivations and attempt to predict his reactions to situations as they arise. He should put tactful questions when answers to them assist him to know better the desires of his superior as they pertain to military matters, and when the questions can be put without arousing offense. These suggestions derive from the principle that there are wide individual differences in superiors and what might appeal to one

would be acted on unfavorably by another. The solution is to know your superior as well as possible, so that appropriate matters may be presented in such a manner that they will be favorably received. All of these suggestions derive from the fact that an individual can adapt more effectively to another person to the extent that he knows that person's personality.

Principles in developing co-operation.—Despite individual differences in superiors, there are usually some approaches that will be favorably received by most of them. It is well to be acquainted with these because in military life there is often a change in the individual to whom any one is responsible, and the generally accepted methods have to be relied upon until one can learn the personality characteristics of his new superior. One can try the generally applicable methods and observe closely their effects. He can revise them in the light of his observations and, through his observations, he learns about the personality of his new superior.

1. Show due respect to your superiors.—Primary among the generally acceptable principles is the desirability of putting one's suggestions for the accomplishment of tasks or goals to a superior in such a way that they imply that the administrator fully realizes that the decision is the prerogative of the superior. If any of the suggestions are adopted and prove successful, the administrator can usually motivate wholesome relationships if he makes inherent in his report of the success to the superior the realization that it was the judgment of the superior which decided, in advance, that the ideas would be successful. This tends to encourage, in the superior, the feeling of ownership for the program involved, and thus the program obtains his support more effectively. Several repetitions of this nature create in the superior more and more of a feeling of personal ownership for all of the programs that derive from the administrator

under consideration, to the end that the latter obtains a very high level of support.

The above methods are effective because most individuals enjoy knowing that their prerogatives and achievements are appreciated, and they then tend to like and react favorably to those who reveal this appreciation. In addition, individuals tend to protect and encourage that which they identify with themselves, i.e., those programs which they feel that they own.

2. Accept responsibility.—On the other hand, if an idea, suggested by the administrator and approved by the superior, should fail, the report of failure should include an admission by the administrator that he suggested the idea and accepts responsibility for its failure. The necessary derogatory impression ensuing from a report of failure is lessened by including a suggestion — particularly well thought out—to improve or substitute for the idea which failed on first trial. Individuals react against reports of failure and tend to dislike and receive unfavorably those individuals who bring such reports, particularly if the reports do not indicate sufficient self-responsibility by the reporting officer. It is also true that a report of failure is less disturbing if it is accompanied by a solution.

3. Give credit to subordinates.—Many of the suggestions which the administrator recommends to his superior will originate with his immediate sub-administrators or those lower in the administrative echelon. It is well that the administrator credit them to the appropriate individuals when he recommends them to his superior, because this is one way in which the administrator can encourage his superior to the realization that his actions are not predicated on a mere desire to create a particularly favorable personal impression. An administrator will not derive effective co-operation from a superior if the latter is suspicious

of the motives of the former. In addition, to give the credit where due will help one's relationship with one's sub-administrators, because the chances are that the superior will acknowledge the contribution at some time to the sub-administrators concerned, and the sub-administrators will appreciate knowing that they have been given due credit. Not only this, but credit and appreciation are motivations to greater achievement, and the administrator should realize that his success is dependent on the achievement of his personnel.

4. Prepare before expressing disagreements.—At times, the administrator will receive from his superior directives with which he may immediately disagree. It is wise that he be hesitant about expressing his disagreement unless invited to do so; and then it should be done with reservations. It may be that the superior, and even his superiors, have spent a great deal of time thinking through and studying the directives. The directives may be the product of tremendous effort. The administrator, a junior, by objecting with little apparent study, may not portray due respect and may be unfavorably received because of the apparent failure of the administrator to give due study to the directives before voicing his attitude toward them. Also, if he takes time for himself and his sub-administrators to study the directives and report to him, he may arrive at more valuable conclusions. These conclusions will be more respected because they have first been given due consideration, and the superior may not be as emotionally interested in the directives as he was soon after he may have spent hours working on them and thinking about them. Also, the administrator will establish an attitude of confidence toward himself if he is very cautious about raising problems in connection with directives. He may be able to establish in his superior the attitude that the latter

should consider very carefully when the administrator raises a problem. This, of course, would be a definite asset to the administrator and would probably spread to become a more general attitude of regard by the superior toward the administrator.

These suggested hesitations in reacting to directives from the superior are based on the following psychological principles: failure to react with due consideration and respect for the efforts and position of others often creates antagonisms. The antagonisms often express themselves in unfavorable reactions to the individual who fails to show due consideration and respect. The antagonisms, together with unfavorable reactions, are more apt to occur when the individual is emotional, perhaps because of extreme interests or extreme pressures, or when the individual is fatigued.

5. Keep the superior informed.—Another possible way to build a favorable attitude in the mind of the superior, save him embarrassment, and make it possible for him to justly defend the actions of his subordinates, is for the administrator to keep the superior especially well informed on what transpires. This applies, in particular, when the administrator or his staff has been guilty of an oversight or other type of negligence, or when it is necessary to issue directives to commanders of lower echelons to which they may be expected to object. The chances are that the negligence or objection will be reported through command channels. The commander can do much to retain co-operation and understanding among all concerned if he is in a position to give immediately the full story on the matter under consideration.

Just the fact that those raising questions discover the commander to be informed on the details of the situation helps to solve the psychological tension. Psychological tension in situations like

this appears, in part, because some subordinate commander feels that some staff officer of the higher echelon is usurping authority.

To find the commander informed also helps build good relationships between him and the other commanders. The junior has evidence that the senior is really on his toes. Also, the senior commander, by being prepared in advance, avoids the creation of tension in himself by not being able to answer the inquiry of the junior. Psychologically speaking, any situation creates tension which commands a response for which the individual is unprepared. The tension often takes the form of emotional antagonism toward the object who creates it; in this case, the junior commander. So the suggestion offered here, that the administrator attempt to keep his commander informed, makes for good human relationship—not only between the commander and administrator, but also between the commander and his subordinate commanders.

There is, of course, always a question as to the extent to which matters of potential objection and negligence should be reported to the superior by the administrator. The answer to this problem depends on the personal preference of the superior and can usually be discovered by appropriate questioning when such matters are reported. His preference will usually reflect the attitude of the individuals to whom he is responsible and the tendencies of lower and higher commanders in reporting matters objectionable to them. Some commanders will attempt to report their objections and their reasons to the office which issued the directive, so that a more satisfactory arrangement may be evolved at that level, if possible. Others will invariably report their objections to personnel in higher echelons of administration; it is therefore desirable that such personnel be well informed, because they can thereby make a

more favorable impression on the objecting commander, and enhance the chances of continued co-operative understanding.

Developing mutual understanding.—The points just outlined are considered generally helpful to an administrator in adapting to his superior. They are predicated on the following principles: that personal understanding between the two concerned is of primary importance; that the administrator, as the junior, should consider it his responsibility to make whatever adaptation is necessary to accomplish the desired relationship; that the administrator should regard himself as an assistant to the superior in the accomplishment of the latter's mission; that frankness and co-operation are essential to personal understanding; and that credit will accrue much more readily to those to whom it is due if they make no obvious moves designed merely to enhance it, and that self-credit, especially in a war effort, is of no consequence. The one great objective should be the successful and efficient prosecution of the war.

Administrative Leadership

The fundamental fact to keep in mind in considering the relationships of the administrator to his sub-administrators is that we are examining an echelon where the size of the mission is so large that its accomplishment has been entirely delegated. The administrator is thus free to give his full time to the supervision of his subordinates. The administrator is dependent upon his subordinates for accomplishment of the mission and his success depends on his qualities of leadership in the particular field involved.

Inform your subordinates.—The administrator's job is to assure that the maximum achievements are realized by his subordinates. These achievements must be realized as a functional component of a much larger whole. They must be appropriately adjusted to the much larger

functional framework. The administrator must, therefore, be a successful leader. He must be able to give his sub-administrators a clear, concise picture of the mission for which he is responsible. He must be able to give a significant and meaningful picture of how this mission fits into the larger framework. He must be able to teach each sub-administrator to realize and comprehend his particular goal in its perspective to the goals of other sub-administrators, and in perspective to the still larger functional framework. He can test his success. If his subordinates are making recommendations which his knowledge of the over-all situation frequently reveals to him are inappropriate, then he is not keeping his subordinates sufficiently well informed. If he is approving and passing these recommendations on to higher administrative echelons, where they are not favorably considered, then he is not keeping himself nor his subordinates sufficiently well informed. The suggestions just offered are believed to derive from the principle that appropriate achievements depend on clear-cut understandings of missions, and that one characteristic of respected leadership depends on an unbiased ability to search one's self and one's organization for shortcomings before blaming subordinates.

If the shortcomings are discovered by the administrator to be within himself, he should take immediate steps to correct them. One way that he can usually assure himself that he and his subordinates are sufficiently well informed to properly discharge their duties is to attempt to keep himself sufficiently well informed to accomplish the mission of his superior. The administrator should also frankly attempt to keep his immediate subordinates sufficiently well informed that any one of them could step into his position. This has the effect of keeping a personal goal immediately in front of all personnel concerned; it acts as a strong motivating

factor. It also makes a very favorable impression on superiors to observe that an organization continues to function smoothly, even though key personnel are suddenly lost.

Assist your subordinates to know your personality.—Another method of giving direction to the work of subordinates is for the administrator, as the leader, to assist his subordinates to know his personality characteristics. The better he acquaints them with his personality characteristics, the better they will be able to follow his desires. He will assist his subordinates in this respect if he always gives reasons for his decisions. In addition, this policy makes him very careful of his decisions and often prevents him from making errors of decision, especially if he creates in his subordinates a feeling of freedom to express disagreements. This feeling is enhanced if such expressions are always given careful and tactful consideration and if appreciation is shown for them, even though the ideas are not accepted. The approach just offered is believed to derive from the principle that freedom of action—fostered by an over-all knowledge of the mission plus responsibility for definite goals—encourages initiative.

Develop initiative and responsibility in subordinates.—Initiative can often be encouraged still further by emphasizing the responsibility of the personnel to whom goals are assigned. Such personnel will sometimes come to the administrator with questions designed to obtain the solution from him. If the administrator gives a solution, he encourages dependence upon him at the expense of the proper development of his subordinates. People develop through accepting responsibilities and discharging them under guidance.

The assignment of goals also obligates the administrator from the point of view of other subordinates. These subordinates

feel that the administrator should at least give them an opportunity to express their opinions on matters prior to making a decision. Accepting this obligation should not only assist in developing and maintaining desired personal relationships, but should produce valuable ideas which might otherwise be overlooked.

Summary on administrative leadership.—The suggestions given above are based on the principle that smoother personal relationships are maintained, and more is achieved, when all personnel are given a clear-cut understanding of their responsibilities, are taught to exercise their initiative, are kept well informed, and are encouraged to express themselves.

Work for the Mission of the Superior

By keeping himself especially well informed and by thinking out decisions with sub-administrators, the administrator keeps himself adept in dealing effectively with his co-administrators. He must co-operate with the other administrators and often finds himself in competition with them. He must co-operate with them because all are working for the accomplishment of the mission of their common superior and for the greater goal of successful and efficient prosecution of war. The administrator is often in competition with his co-administrators. Often, all of them are highly motivated by the superior, and all are rated on efficiency by their superior. Sometimes disagreements arise among the sub-administrators as to how the mission of the superior should be accomplished, and which of them should be responsible for the various aspects of the mission. The administrator who is well reinforced by knowledge and principles that have been carefully thought out has the advantage, because he is prepared for discussion periods at any time. In considering the alternative solutions that may arise in such discussions, the efficient accomplishment of the mission of his

superior should be his primary concern. This principle, in conjunction with an unusual background of pertinent knowledge, will give him a solution for which he can gain support through an intellectual, non-emotional presentation. This presentation will encourage better personal relationships if the intellectual contributions are offered in the form of suggestions, and if the contributor takes advantage of every opportunity to draw them from the personnel in the discussion. He will then usually be admired by his colleagues and appreciated by his superior.

These proposals concerning an efficiently functioning administrative organization are analogous to those often proposed for the healthy minded functioning of a human being. They come from the primary principle that efficiency will result in an organization or person if there is a clear-cut goal adjusted to capacity, and if all components are carefully directed and motivated toward the objective.

Summary

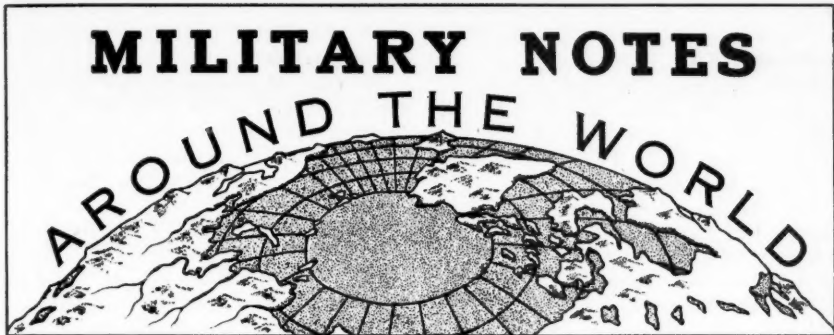
This article outlines psychological approaches that have been applied to certain army administrative problems. The discussion is directed at that level where the administrator must depend entirely on his subordinates for the accomplishment of the various tasks. The administrator's achievement depends on leadership and organization. He teaches his subordinates to understand clearly their goals in proper perspective to the larger missions. He encourages and develops responsibility, initiative, and determination in his subordinates, and gives them the maximum authority justified by their understanding of the missions. He establishes an organization which facilitates wholesome personal relationships and which minimizes the amount of co-ordination required. He motivates maximum effort and directs it into the channels where it is most productive. He is an effective leader in an administrative situation.

A newcomer to any job should have some fresh ideas that can improve a department or organization. He should not be satisfied with himself, when he vacates that job, if he has not got something new and valuable incorporated into the machine he has been a part of.

Air Marshal Sir Thomas W. Elmhist, Great Britain

MILITARY NOTES

AROUND THE WORLD



UNITED STATES

Staff Reorganization

The Army went back to the G-system on 1 March 1950, and reduced the number of general staff divisions from five to four.

The four divisions under the new setup are: G-1, Personnel; G-2, Intelligence; G-3, Operations, and G-4, Logistics. The heads of each will be called Assistant Chiefs of Staff.

The five-division organization which has been discarded consisted of Personnel and Administration, Intelligence, Plans and Operations, Organization and Training, and Logistics. For a time, after the War, there was a sixth division, Research and Development, but it was removed from the division level and made a section of the Logistics Division. The top officer of each division was designated as Director.

The reduction was made by abolishing the Plans and Operations Division. This had 105 officers, 12 enlisted personnel, and 75 civilians. About half the personnel went into G-3, and the remainder were reassigned.

The move strengthens the position of the Chief, Army Field Forces. He will take over the training functions which previously were the responsibility of O&T. Residual functions and responsibilities were transferred to G-3.

To many, the existence of both O&T and Army Field Forces appeared to be an anomalous situation, and the elimination of one of the two agencies had been considered for some time.

In the new establishment, the heads of the staff divisions will be more directly responsible to the Chief of Staff. The division directors under the old system had authority to send out directives to the field. In some cases, due to inadequate co-ordination, conflicting orders went out from separate divisions.

The title of the Deputy Chief of Staff for Plans and Combat Operations has been shortened to Deputy Chief of Staff for Plans. He will supervise planning of all staff divisions.

The Office, Chief of Special Services, is abolished. Its functions, except for supply and procurement which will be handled by the Quartermaster General, will be absorbed by the Adjutant General.

The Public Information Division and the Troop Information and Education Division are merged under the Office, Chief of Information.

The Finance Department has been made a Special Staff division, but it will continue to operate under the Army Comptroller.—*Armed Force.*

Sustenance Kit

A new sustenance kit that attaches to an airman's back-style parachute is the latest boon to Arctic survival to come out of the Air Matériel Command's Aero Medical Laboratory.

A total of 22 different items are packed into the kit. Perhaps the most important is a recent development of the Aero Medical Laboratory—a vacuum-packed sleeping bag which keeps its occupant warm even at -40°F . Thanks to vacuum packing, the sleeping bag occupies approxi-



Seat-style survival kit.—AMC photo.

mately 40 percent less space than its hand-rolled counterparts, leaving space for other survival equipment.

Also included are such items as a canned-heat cook stove, a .22 cal. revolver, mittens, ski goggles, signaling mirror and flares, waterproof matches, wool socks, compass, water container, pocket knife, survival manual, and food packets.

The kit is zippered to the seat sling of the parachute harness.—Air Matériel Command.

Army Vessels

The fleet of transports and coastwise vessels operated by the Army for the past 52 years was turned over to the Navy recently in formal ceremonies held simultaneously in New York, San Francisco, and Seattle.

The 42 ships currently operating out of New York were transferred aboard the transport *General Alexander M. Patch* at Pier 4, New York Port of Embarkation.

Two hundred representatives of the Army, Navy, and the maritime industry gathered in the dining salon on the promenade deck to hear the commander of the Port of Embarkation relinquish control of the vessels to the deputy commander of the Atlantic division of the Navy's newly formed Military Sea Transportation Service.

In accepting the ships on behalf of the Navy, the Navy spokesman emphasized that the Navy had no intention of competing with private enterprise. The new service, he said, is "designed primarily to meet extraordinary demands that cannot be met by private industry."

"It is our policy," he asserted, "to foster an adequate merchant marine. The Navy is an all-embracing service, though many people think of it in terms of its fighting ships only."

The Sea Transportation Service came into existence 1 October 1949 as the result of a directive of the Secretary of Defense which placed all sea-going transports under one command. The transfer in New York involved 10 passenger transports, 12 cargo ships and 6 coastwise craft operated by the Army, and 14 passenger transports chartered to the International Refugee Organization.

The transfer of ships to Navy control will not affect dockside operations, ports of embarkation, or harbor craft, which will continue to be Army Transportation Corps responsibilities.—*The New York Times*.

Ejection Seat

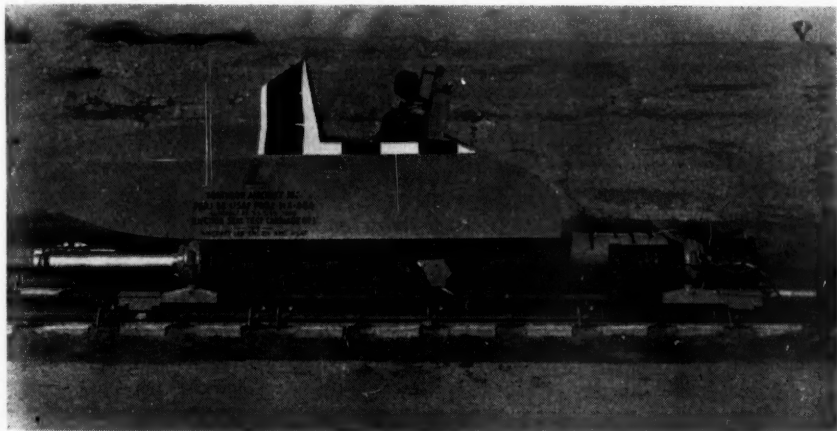
The US Air Force's ejection seat, which has proved successful in permitting a jet pilot to escape from a plane at 555 mph, is being tested at speeds exceeding that of sound.

Air Matériel Command engineers, working with officials of Northrop Aircraft, have built a 2-mile railroad track on a concrete bed in the California desert. A maximum of 15 10,000-pound rockets are used to propel a 2,300-pound sled containing an F-89 ejection seat along the track at speeds up to 1,100 mph.

If it is found that the seat cannot get

feature, to be tried out in the Douglas X-3 research plane now under construction, is believed to improve a pilot's chance of survival because there is no possibility of becoming involved in the plane's tail surfaces.

The test vehicle works like this: A fixed number of rockets attached to the rear of the sled are fired simultaneously, propelling the carriage forward at any predetermined speed. At about the halfway point, when the desired velocity of the sled has been reached, the F-89 ejection seat catapults a dummy clear while



This 2,300-pound test carriage races down a 2-mile track at speeds up to 1,100 mph. At its maximum speed, it catapults a dummy from an F-89 ejection seat.—AMC photo.

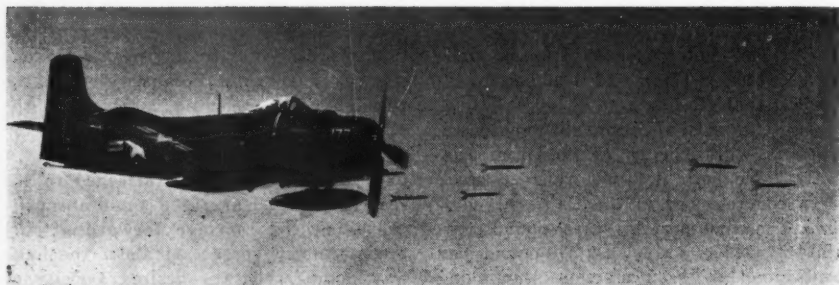
a pilot free of his disabled plane at trans-sonic and supersonic speeds, research will be conducted to improve the present version or combine it with the complete "escape capsule" now being developed.

Various Navy and Air Force catapults are being tested in the 20 different tests which make up the project. Among them will be one which will eject the pilot through the floor of the plane, rather than through the normal opening left when the bubble canopy is released. This

the sled continues whizzing down the track. The sled is stopped before reaching the end of the track by firing a number of rockets having half the original propelling thrust ahead of it. These forward-firing rockets tend to retard the forward motion of the vehicle, bringing it to a stop within a mile after the dummy is ejected.

Total weight of the ejected mass is about 310 pounds. Forces acting on the dummy are checked by cameras and telemeters.—Air Matériel Command.

Air-to-Air Rocket



The missiles being fired from the Douglas *Skyraider*, above, are the first successful air-to-air rockets to be developed by the US Navy. The new rocket is small enough to be carried in quantity, yet fast and powerful enough to destroy any known plane with a direct hit. Folding fins reduce air resistance.—Department of Defense photo.

Flight Simulator

Plans of a recently completed calculating machine for checking the flight characteristics and control equipment of an aircraft while it still is on the drafting board were described recently by the president of Massachusetts Institute of Technology.

The machine, known as the "flight simulator," requires only flight characteristics obtained from advanced working plans and data from wind tunnel tests of a model of the proposed craft.

The flight simulator involves the use of intricate computing machines and a "flight table" on which problems relating to flight stability were worked out.

The MIT president described the flight table as an arrangement of gimbals, similar to those used on shipboard compasses to overcome the ship's roll.

The gimbal frame, operated by a high speed "hydraulic servo-mechanic," he said, automatically controlled instruments which carried out motions in accordance with electrically transmuted commands. This was used to "orient the automatic control system of a plane or guided missile just as it would be tested in actual flight."—*The New York Times*.

Mobile Laboratory

A self-contained unit for field testing petroleum fuels and lubricants, light enough to be air-transportable, has been manufactured according to plans prepared by the Quartermaster Corps.

Built into a 4-wheel trailer, the mobile laboratory is said to be equipped to test all grades of gasoline, fuel, lubricating oil, and greases. Precise analyses are facilitated by special devices capable of maintaining any desired critical range of temperature down to -100°F .

The trailer-laboratory is ordinarily drawn by a $2\frac{1}{2}$ -ton truck, or its equivalent, but in unusual circumstances a jeep may tow it. For loading into a cargo plane, the trailer body is automatically raised to the level of the plane floor and the wheel carriages are dropped.

Quartermaster Corps personnel have cited the need for mobile laboratories to ascertain the purity of petroleum products shipped over long distances to field units. Also required, as was demonstrated in World War II, is a forward testing station where petrol found in captured enemy fuel dumps may be properly identified before use.—*Armed Force*.

Hunter-Killer Destroyers



The US Navy's newest hunter-killer destroyers, the USS *Carpenter* (above), and the USS *Owens* (below), are designed to hunt and kill high speed *Snorkel*-type submarines. The two vessels are equipped with the latest armament and sound detection devices and have a speed in excess of 30 knots.—Department of Defense photos.



Gas-Turbine Engine

The United States claims the world's most powerful propeller gas-turbine engine for its size and weight. It delivers two horsepower for each pound of weight.

The engine, the T-40, will first be used in the Navy's 70-ton patrol flying boat, the XP5Y, designed for long-range day and night patrol against submarines and for rescue operations.

The big flying boats will be able to carry depth charges, bombs, rockets, and guns along with extensive electronic equipment for search and detection.

The T-40 comprises twin engines operating as a single unit with a common gearing to counter-rotating 6-bladed propellers. For economy, either half of the engine may be used separately while cruising. Four of the twin units will be installed in the XP5Y.

The T-40 delivers 5,500 horsepower. Each separate power unit is 20 inches in diameter and 7 feet long. The twin units weigh 2,500 pounds.

The T-40 delivers one horsepower for an hour on just over 10 ounces of fuel. Engineers say its efficiency is the highest ever attained by a prop-jet approved for flight. The best piston engines do much better, however, while turbo-jets have a considerably higher fuel to power ratio.

A prop-jet or turbo-prop engine is similar in design to a turbo-jet. The difference is that most of the power from the combustion of gases is converted through turbine wheels into propeller shaft energy and little of it remains for tail pipe exhaust. In a turbo-jet, the airplane is driven solely by the thrust of the heated gases escaping from the tail pipe.

Engines of this type operate most efficiently at near peak power. That accounts for the twin design of the Allison unit, since after the plane reaches normal cruise stage one-half of the unit can supply enough power.—News report.

Synthetic Fuels

If the synthetic liquid-fuel program that carried Germany through 5 years of war were applied to the coal reserves of Wyoming, it would yield enough gasoline to power the nation's 38 million automobiles for 2,743 years, on the basis of present consumption.

This is the estimate of scientists engaged in the government's synthetic liquid-fuel program. They maintain that Wyoming, with the largest supply of natural coal deposits in the country—620 billion tons—will some day be the center of a new petroleum industry based on the conversion of coal to oil.

This report, coming on the heels of a similar one from Rifle, Colorado, on the conversion of useless coal shale, boosts the estimates for coal and shale-locked oil from 300 billion to 1,500 billion barrels. This would be enough to serve US industries for 700 years.

In 1944, Congress passed the Synthetic Fuel Act which authorized the Bureau of Mines to try to find a practical process to ease the impending oil shortage.

One of the government pilot plants is located at Laramie on the University of Wyoming campus. It was established there because Wyoming has the greatest amount of sub-bituminous coal reserves. Moreover, it is a grade of coal that breaks down upon exposure to air, making it ideal for the conversion process.

Conversion of coal to oil is nothing new. Other nations, notably Germany and England, developed similar programs many years ago. The German process—gas synthesis, and hydrogenation—have been adopted by our own scientists who regard them as the most successful.

The hydrogenation process consists in forcing hydrogen into the complex coal molecules and removing oxygen so that the chemical constitution is changed to approximately that of petroleum.—*The New York Times*.

Streamlined Helicopter

The US Navy recently revealed another step in its long-range helicopter development program with the release of information on the new all-metal fuselage HRP-2 tandem rotored Piasecki transport helicopter.

The new, streamlined transport-type helicopter is primarily a refinement of the Navy's Piasecki HRP-1—the so-called "Flying Banana"—20 of which are in service with the Navy, Marine Corps, and Coast Guard. The aluminum-alloy fuselage of the Piasecki HRP-2 has been com-

for the HRP-2 calls for eight passenger seats, plus the pilot and co-pilot. Better than double the "specified number" of personnel could be carried in a short haul.

In an emergency, nine litters can be fitted and that number of patients carried in the HRP-2. Normal litter installation calls for six litters, plus two medical attendants and the pilots.

With a fuselage length of 54 feet, and with the lifting rotors at each end of the streamlined fuselage and the engine toward the rear, the HRP-2 provides a



The streamlined HRP-2 Piasecki helicopter, above, is a refinement of the original "Flying Banana" HRP-1. As many as 12 litter patients can be carried in the HRP-2.

pletely redesigned from the earlier fabric-covered HRP-1 model to effect cleaner lines. Drag has been materially decreased, resulting in higher cruising speeds and generally better performance.

Intended primarily as a "mercy mission" aircraft and named officially the *Rescuer* by the Navy, the present Piasecki tandem rotor helicopters of the HRP type have troop seats and litter installations. The Navy's standard specification

clear cabin space 20 ft long by 5 ft, 6 ins wide, and 5 ft, 6 ins high.

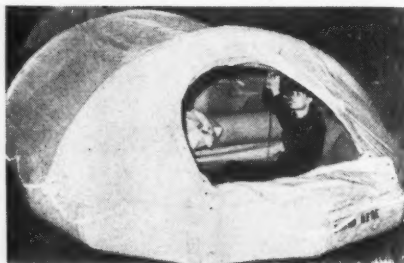
Provision has been made in the HRP-2 design to permit the installation of larger and more powerful engines to provide higher altitude operation and greater load carrying capacity. A higher-powered HRP-2 would be able to accommodate up to 12 litters or 20 troop seats or, in an emergency, 27 personnel seated on the cabin floor.—Piasecki Helicopter Corp.

GREAT BRITAIN

Covered Life Raft

The Royal Navy is testing a new type life raft capable of holding from 8 to 20 men. Experiments are being made with paraffin heaters for use inside the raft, and canaries and mice are taken on board to give warning of monoxide fumes.

The men making the tests are given two sets of survivors' rations, one complete 3,000-calorie diet and one minimum ration of 1,500 calories. Each man is also



Above, a covered inflatable rubber life-raft; below, the raft completely closed.



given about one pint of water daily, either carried in tins or produced by a new type of sea-water still, which is also undergoing tests.

Some of the men testing the raft wear rubber survivors' suits which, on being inflated, cover the wearer from head to foot and give maximum protection from exposure. A new type life-jacket, developed from the RAF type, is also being tested.—*The Illustrated London News*.

AUSTRALIA

Women's Army

The Australian Women's Army Service is to be revived as part of the Australian defense program. The government hopes that the AWAS will reduce the calls upon man power for clerical work in the Army when compulsory national service is introduced. More men would thus be available for active work in the forces. No great difficulty is expected in obtaining sufficient numbers for the women's service, which, under the proposed plan will be voluntary. During the War, the enlistment of women in Australian Military Forces reached 27,485; the Royal Australian Navy, 2,720, and the Royal Australian Air Force, 19,031.—*Australian Weekly Review*.

PAKISTAN

Defense Budget

For the second year, Pakistan is to spend nearly half her national budget on defense.

The Pakistani Finance Minister announced recently that revenue for 1950-1951 was estimated at 1,136,400,000 rupees (about \$345,000,000) and expenditure at 1,155,400,000. With additional taxation, the year would close with a small surplus.

Defense spending would total 500,000,000 rupees (about \$152,000,000), slightly under the revised estimates for 1949-1950.

The Minister said that 1949-1950 had witnessed a "steady consolidation and strengthening of our defenses." Defense estimates for the past year had to be increased "due to some essential additional measures that had to be undertaken."

Pakistan's financial resources had been strained, "but we would have failed in our elementary duty if we had not given the highest priority to this expenditure."—*The New York Times*.

CANADA

Naval Organization

The Royal Canadian Navy has divided its fleet between operational and training ships and has announced that operational vessels and carrier-borne aircraft are to be welded together into a specialized anti-submarine force.

The action to split the fleet is described as "the most important step taken by the Navy since the War."

The first move in this direction actually was made in 1949, when the cruiser HMCS *Ontario* was freed of all operational commitments and assigned strictly to training duties. However, there were no ships set aside for purely operational purposes, all of them being engaged, of necessity, in training activities at various times and in varying degrees.

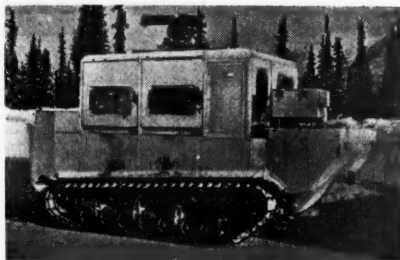
The operational force, to begin with, will consist of the aircraft carrier *Magnificent* and destroyers *Micmac* and *Huron* on the East Coast, and the destroyers *Cayuga* and *Sioux* on the West Coast.

The crews of these ships will contain a high proportion of trained personnel and will not be subjected to large-scale changes at frequent intervals, as is the case in training craft. A certain number of untrained men will be absorbed into their ship's companies from time to time, but only so many as not to affect their efficiency.

In this way, it is hoped that efficiency and teamwork will be developed to a high degree—initially in the ships themselves, then in the force as a whole.

Under arrangements which have been in effect for some time, British and United States submarines will be made available to the RCN for practical training purposes. These submarines will be employed both in training anti-submarine personnel and in advanced exercises with ships and aircraft of the operational force.—*Army and Navy Journal*.

Exercise "Sweetbriar"



US-Canadian maneuvers in 1950 tested equipment and tactics. Above, a "weasel."



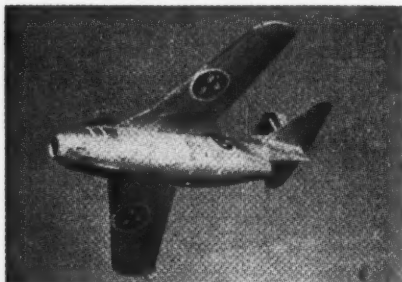
Above, Arctic-equipped soldier; below, gunners firing mortars.—*The Sphere*.



SWEDEN

Transsonic Jet

The new Swedish transsonic jet fighter, the *Saab-29* (Air Force designation, *J-29*) which is produced by *Svenska Aeroplan A.B.* at Linköping, has now—after more than 12 months of flight tests—reached the Mach number it was designed for. The *Saab-29*, second Swedish-designed-and-built jet fighter, is a pressurized, single-



The *Saab-29*, Swedish jet fighter.

seat, single-jet interceptor easily recognized by its swept-back wings and its somewhat bulky fuselage. While the prototypes are equipped with British-built de Havilland *Ghost* jet engines of 5,000 lb. static thrust, the production model will have engines of the same type manufactured in Sweden.—*Canadian Aviation*.

Bofors AA Gun

The Bofors Company of Sweden has developed a new antiaircraft gun. This weapon is a 120-mm (approximately 4.7-inch) high- and low-angle, quick-firing weapon. It is the first example of adopting the fully automatic principle to a gun larger than 40-mm. The new weapon is credited with solving the problem of defense against jet planes and missiles of the V-2 type. Its greatly increased rate of fire and the speed with which it can be directed against flying targets makes it much more effective than the fastest guns formerly in use.—*Ordnance*.

USSR

Civil Defense

Some 30,000,000 Russians have received basic civil defense training in preparation for an emergency, a report by the US Senate-House Atomic Committee indicated recently.

In a pamphlet on civil defense against atomic attack, the committee observed that the Soviets are planning to train additional civil defense "volunteers" at the rate of 5,000,000 annually.

The pamphlet said the Russian civil defense agency, *Osaviakhil*, dates back to the early 1920s.

"At the exercises held in 1947, there were said to be 20,000,000 participants," the report said.

Assuming that 5,000,000 were also trained in 1948 and in 1949, the Russians now would have 30,000,000 trained persons.—*The New York Times*.

Naval Academy

The Soviet government recently announced the opening of a naval academy in Leningrad to turn out officers after a 2-year course. Russia's ever-rising role as a sea power obtained a big boost in January with the announcement of the appointment of a Minister of Shipbuilding.

Informed foreign diplomats in Moscow said then they were convinced Russia was making great progress in the construction of both a naval and merchant fleet. Since publication by *Jane's* last December of the building program, some reports have said that at least one of the battleships, the *Sovietskaya Soyuz* had been completed and outfitted at Leningrad.

Jane's said that 400 of the new Russian submarines being built were intended for service in the Pacific. Since then, there have been many unconfirmed reports of Soviet submarines operating from Siberian and Communist Chinese ports.—*The New York Times*.



The British Expedition to Greece, 1941

Digested by the **MILITARY REVIEW** from an article by Field Marshal Earl Wavell in "The Army Quarterly" (Great Britain) January 1950.

THE story of Greece in World War II begins on 28 October 1940, with perhaps the most wanton and unprovoked of all the Axis aggressions, the delivery to Greece's President Metaxas at 3 a.m. of the Italian ultimatum. This was promptly rejected; and Greece on that day joined the British Empire as the only other nation actively engaged against Hitler and Mussolini.

The Greek people at once put aside all political differences and rose united to meet the invasion. Fighting with the utmost gallantry, they not only drove the greatly superior Italian invaders back across their frontier but a long distance into Albania. The British from their scanty resources sent several air squadrons to the assistance of their new ally and old friend, but only such ground troops as were required for the service of the air squadrons.

Greece, completely victorious on her northwestern frontier, was now menaced on her northeastern. The Germans, who had been in occupation of Rumania since October, were obviously preparing to enter Bulgaria. From the British point of view, this implied a threat to the port of Salonika and to our control of the Eastern Mediterranean, which we still maintained

in spite of the much superior numbers and weight of the Italian Navy.

My personal part in the story begins in January 1941, when I received instructions from London to visit Athens and to offer the Greek government certain forces of field artillery, antiaircraft artillery, anti-tank artillery, and armored troops, to assist in the defense of Salonika and Eastern Greece. I flew to Athens in the middle of January and made the offer on behalf of the British government. At that time, my troops in the Western Desert, after defeating the Italians at Sidi Barrani, had captured Bardia, and were preparing to attack Tobruk. The units I was to offer to the Greeks represented a large proportion of my meager technical arms, and had the Greeks accepted the offer, I should have had to stop my advance at Tobruk. I was, therefore, relieved when Metaxas refused the assistance. He said that what we could give would not suffice to stay a German attack, but would give the Germans an excuse to make the attack. I returned to Egypt and gave orders for the prosecution of the advance in the Western Desert, which resulted, early in February, in the virtual annihilation of the Italian Army in Cyrenaica.

Meanwhile, President Metaxas, who had greatly impressed me as a wise and determined leader, had died at the end of January. I have always thought that this took the heart out of the sorely pressed Greek defense. Metaxas may have been an arbitrary politician, but he was a very stouthearted and skillful director of his country's defense at a critical hour.

The Offer of Aid

The next act in the drama from my point of view was a message that Anthony Eden, the Foreign Secretary, and General Sir John Dill, the Chief of the Imperial General Staff (CIGS), were flying to Cairo to consult the three service commanders about a fresh offer to Greece. The new Greek Premier, Mr. Korizis, had appealed to Great Britain for help early in February.

After some delay due to the hazards of flying in the Mediterranean at that time, Mr. Eden and Sir John Dill arrived in Cairo on 19 February. After discussions in Cairo, at which the Commanders in Chief of the three services—there was no unified command—concurred in the plan to support Greece against a German invasion with all the resources which could be spared, Mr. Eden, the CIGS, and myself flew to Greece on 22 February.

At this stage, I should correct two statements which have been widely spread:

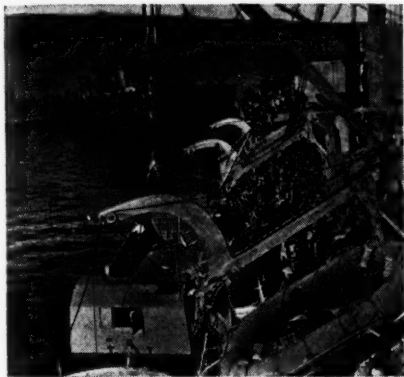
1. That the military leaders were forced into the Greek commitment against their will, for political reasons; and
2. That but for the Greek adventure our forces could have cleared up the North African coast for good and all.

Neither of these assumptions is true. The service chiefs recognized the dangers of the Greek expedition. But they believed that there was a reasonable chance of defending Greece against German attack and that from the point of view of the general strategy of the War it was worth while to take considerable risks to main-

tain a hold on the northern shores of the Eastern Mediterranean. As for the advance to Tripoli, Italian opposition could be discounted as small and likely to be easily overcome. Nothing was at this time known of the dispatch of German forces to Africa. Even so, our own resources were not equal to the task. Our armored vehicles were worn out by an advance of 500 miles; we had not enough mechanized transport to maintain even a small force for an advance of another 500 miles to Tripoli; and both in the air and on the sea, we were still numerically inferior to the Italians alone, without any German reinforcement. It would have been an intolerable strain on the Navy to maintain a military and air force at Tripoli when even Benghazi could not be used as a port for lack of antiaircraft artillery and other resources.

Defense Plan

Our deliberations on Greece took place outside Athens at Tatoi Palace. The most important feature was a clear and able statement by the Greek Commander in Chief, General Papagos, on the line to be held against a German attack from Bulgaria. He said that the fortified frontier line, known as the Metaxas line, was the strongest, but was too extended now that all the Greek divisions except three had been withdrawn for employment in Albania. The line of the Struma, held by the Allies in World War I, had the advantage of covering Salonika. But this line was also too extended, unless the Yugoslavs came in as allies when we must cover Salonika. The strongest line was one which ran from the sea by Mount Olympus—the Veria Gap—Edessa—to Kajmakalan on the Yugoslav frontier. General Papagos estimated that this line might be held with a minimum of five well-equipped divisions. It was generally referred to as the Haliacmon line, from the name of a river which formed part of it. It was



Although the British intervention in Greece in 1941 ended in defeat, it "delayed the German attack on Russia by several weeks and thus saved Moscow from falling in the winter of 1941." Above, left, a British troopship evacuating troops from Greece. Above, right, a flying-boat used in the evacuation; about 45,000 troops were evacuated. Right, German troops moving toward the Greek town of Larissa. Below, left, the Nazi flag flying over the Acropolis, after the German occupation of Athens. Below, right, a German troop carrier (in flames) and parachutists, in the airborne invasion of Crete.



naturally strong. Mount Olympus was impassable for large military forces; the Veria Gap, through which ran the main road, could be easily fortified, as could the hills between it and the Yugoslav frontier. This left flank depended, of course, on the Yugoslav attitude. The political appreciation of this was that though we could not count on the Yugoslavs as allies, we could reasonably count on their resisting any attempts by Germans or Bulgars to pass through their country to attack Greece. The military leaders, with memories of the Serbian resistance in World War I, believed that the Yugoslavs would at least impose a long delay on any enemy movement through their hills.

We agreed with General Papagos that there was a good chance of holding this Haliacmon line with the forces available, provided that the Greek troops in western Thrace and Macedonia (three good divisions) were at once withdrawn to it. Also, another division must be withdrawn from Albania, and the British force—two Australian divisions, one New Zealand division, one Polish brigade, one British armored brigade and other troops, including two medium artillery regiments—had to be set in motion at once from Egypt to Greece.

It was therefore decided after a discussion lasting an afternoon and an evening that the British and Greek forces of 7 1/3 divisions (4 Greek and 3 1/3 British) and one armored brigade should be assembled on the Haliacmon line with all possible speed and should begin fortifying it. Since Papagos thought that the line could be held with five divisions, we had thus a reasonable margin of safety. We had, or thought we had, secure flanks on the sea and on Yugoslavia. We assured ourselves that if we acted at once and speedily we could assemble our forces before the Germans could pass through Bulgaria and reach the Haliacmon line. It seemed, therefore, an acceptable military operation. The

chief danger, as we saw it, was German air superiority, which might even make our supply by sea hazardous. Admiral Sir Andrew Cunningham, the Naval Commander in Chief, and Air Marshal Sir Arthur Longmore, the Air Officer Commander in Chief, saw this danger, I think, more clearly than I did. But they never hesitated in supporting the general plan.

From the political point of view, we secured obvious advantages. By supporting our ally Greece, we encouraged others to resist; for instance, Turkey and Yugoslavia. It would help to convince the United States and the rest of the world that we meant to fight it out to the end, and would raise our prestige. If we could impose a check or long delay on the Germans, it would help to gain the time we needed so sorely to develop our resources.

So satisfactory had appeared our talks that we returned to Cairo next morning. Mr. Eden and General Dill left for Ankara to inform the Turks of our decision, to seek their agreement for the diversion to Greece of equipment due to them, and to discuss the possibility of their supporting Greece by armed force in the event of a German attack. The Turks entirely approved our decision to support Greece, but they would not agree to commit themselves to action. I suppose they were wise from their point of view and possibly also from ours in the long run. They were, in fact, in no state to undertake an offensive war and were in some apprehension that they themselves might be attacked.

The Plan Fails

Now comes the crux of the whole drama. When the British members left the conference at Tatoi, we all understood that General Papagos was going to issue orders forthwith for the withdrawal of the three Greek divisions from Macedonia and of one from Albania and for their establishment on the Haliacmon line. He had, in his able exposition of the situation, emphasized the

necessity for all possible speed. He has since maintained that no decision was to be taken until the attitude of Turkey and Yugoslavia was determined. That was certainly not the British understanding. It was admittedly a hard decision from the Greek political point of view to abandon Western Thrace and Macedonia without a fight; and it may be that when the time came, the decision proved too hard to take.

Whether there was a misunderstanding or whether political considerations in Greece overrode military decision, it is certain that when Mr. Eden and Sir John Dill paid an official visit to Athens on 2 March, the day after the Germans moved into Bulgaria, they found that no orders had been issued for the withdrawal of the Greek divisions. General Papagos now maintained that it was impossible to withdraw them with Bulgaria under German occupation. He also said that the Albanian situation made it impossible to withdraw the promised division from that front.

I was summoned to Athens, where we spent the best part of 3 days in deliberation on the changed situation. It was impossible to persuade the members of the Greek High Command to change their mind on the withdrawal of the Macedonian divisions. The Greeks maintained they must now fight it out on the Metaxas line, though they would obviously be overwhelmed there. All that we were offered for the Haliacmon line was one and a half, eventually raised to three, second-line divisions, a poor substitute for the four first-line divisions on which we had based the original plan. We had now to decide, in the changed circumstances, to withdraw our offer or to continue, accepting the much greater risk. Rightly or wrongly, all the responsible heads, political and military, in the Middle East decided to carry on with the plan. All the Commanders in Chief were agreed on this.

I think it may have been psychological and political considerations that tilted the

balance in the end over the military dangers. To have withdrawn at this stage, on grounds which could not have been made public, would have been disastrous to our reputation in the United States and with other neutrals, which would have ended all hope of Yugoslavia joining the Allies, and would have shaken our ally, Turkey. Our plan had been endorsed by the Dominion governments whose troops were involved. And there were practical difficulties in any reversal of plan; the troops were on the move, and a change would have caused confusion.

I was sure at the time, and I am still sure, in spite of what resulted, that the decision we made at our Embassy in Athens in that first week in March 1941 was the only one consistent with the political requirements of the moment, with military strategy, and with our national honor.

It may be of interest to know that on our return to Cairo we consulted General Smuts, whom Mr. Eden had asked to come to Cairo and help us with his invaluable advice. We went over the whole ground with him. He entirely approved of our decision and telegraphed in this sense to London. The decision was that of the men on the spot, and the doubts came from London, where the Prime Minister and the Chiefs of Staff were apprehensive of a commitment so much more hazardous than that which they had approved 10 days earlier. From the point of view of immediate advantage, they were probably right and the men on the spot wrong. As regards ultimate results, the men on the spot were, I think, right. This was a curious reversal of the usual situation, that the men on the spot take a short-term view and those at a distance a long-term one.

I should also make it clear that there was never any question of our urging the Greeks to resist a German invasion against their better judgment. They always affirmed categorically that they would

fight the Germans if they entered Greece, whether or not we gave them assistance.

Yugoslavia

The spotlight must now be shifted to Yugoslavia. During the whole period that the Foreign Secretary had been in the Middle East, he had been in constant touch by telegram, through our Minister in Belgrade, with the Regent of Yugoslavia, who was supposed to favor the Allied cause. The answers received had been evasive and disappointing. So the British Minister was summoned to Athens early in March and given a letter to the Regent. As a result, an officer of the Yugoslav General Staff came to Athens incognito. His mood was pessimistic and he was uncommunicative about the Yugoslav plans for mobilization and deployment—possibly because, as events showed, these were almost non-existent. The Yugoslavs could, if prepared and ready, have ended the Italian resistance in Albania by attacking their flanks and rear, as well as resisting the Germans in the east.

During the next fortnight, Mr. Eden made strenuous efforts, in a meeting with the Foreign Minister at Cyprus, to persuade the Turkish government to urge the Yugoslavs to take all possible steps to meet a German attack. Turkey was already mobilized. Though the Yugoslavs assured us that they also were mobilized, later events showed how incomplete their mobilization was. Our Embassy in Belgrade, in close touch with Mr. Eden, did what it could to encourage the tougher elements in Yugoslavia to resist—and not without success, as the *coup d'état* later proved. But the Turks persisted that their military weakness precluded anything more than sympathetic neutrality. The news on 24 March that the Yugoslav government had signed the Tripartite Pact seemed to end all hope of help from that quarter. Mr. Eden and Sir John Dill accordingly departed for England. But while

their plane was detained by bad weather at Malta, news was received of the Yugoslav *coup d'état* which overthrew the government and made Yugoslavia a potential ally. They promptly decided to return to Athens.

Although the CIGS was, after some difficulty, allowed to pay a visit to Belgrade incognito, and a staff conference was held on the Greek-Yugoslav frontier, such was the confusion, political and military, in Yugoslavia, that it was quite impossible to arrange any co-operation. Mr. Eden and Sir John Dill finally left Cairo to return home on 7 April, the day after the German attack on Greece and Yugoslavia began.

Summary

Such is, in outline, the story of the genesis of our expedition to Greece. I hope to have shown you three things: that Great Britain and the Dominions came to the help of a smaller nation in spite of all risks; that the Greek adventure was not forced on the military chiefs by the politicians, as it sometimes is alleged; and that the operation as originally planned at Tatoi on 22 February was by no means as hopeless as the outcome made it seem.

I need not say much about the fighting. The Germans were obviously much better informed than ourselves on the disorganization and powerlessness of the Yugoslav Army, the sudden and complete collapse of which exposed the flanks both of the British-Greek Army on the Haliacmon line and of the Greek Army in Albania. Little more than a fortnight sufficed to end the campaign, and the end was obvious some time before that. Our small air force was soon driven out of the skies. Our troops were almost entirely deprived of air cover during their retreat to the Thermopylae line and their re-embarkation. We had fortunately foreseen the possibility of an evacuation and had prepared a plan at an early stage. But the harbor at Piraeus had been blocked by bombing, and we could

remove no heavy equipment. Our losses were heavy, and the striking force we had built up with such pains in the Middle East during 1940 was almost destroyed. A month later, we had to evacuate Crete with further losses, after practically destroying there a German airborne force.

At the same time, Egypt was in peril from Rommel's attack in the Western Desert, where the withdrawal of our force for Greece had left us too weak, but was saved by the gallant defense of Tobruk. A dangerous revolt in Iraq was fortunately quelled by our last remaining reserve. A little later, by scraping the bottom of an apparently empty dish, sufficient troops were collected to save Syria from German occupation. All this took place while the Italian Empire of East Africa was being liquidated by British, South African, Indian, and African troops. Those were busy days in the Middle East.

Conclusion

In conclusion, what was the ultimate effect of our Greek campaign on the strategy of the War? Presumably, had we chosen to abandon Greece, we could have consolidated our position in Cyrenaica, though it would have still been the scene of bitter fighting and we could not have advanced to Tripoli without much further reinforcement. We should have had the troops to counter Axis plans in Iraq and Syria with less anxiety and difficulty. But I do not believe that we could have held Crete with Greece in the possession of Germany.

On the other hand, the evidence is clear that our intervention in Greece delayed the German attack on Russia by several weeks and thus saved Moscow from falling in the winter of 1941. Though the German forces employed in Greece and Yugoslavia were comparatively small, they included a high proportion of armored troops who had to drive long distances. It was the delay in returning and reconditioning these that caused the postponement of the attack on Russia. This cannot, of course, be claimed as a justification of our decision in March, since we knew nothing at that time of Hitler's contemplated treachery toward his ally—though we may have had our suspicions. Our decision was taken on other grounds. I will quote some words spoken by Prime Minister Winston Churchill in the House of Commons on 7 May 1941, after the end of the Greek campaign:

"Looking back on the sad course of events, I can only feel, as the Prime Minister of New Zealand has so nobly declared, that if we had again to tread the stony path, even with the knowledge we possess today, I for one would do the same thing again, and this is the view of all my colleagues in the War Cabinet and on the Defense Committee."

In conclusion, I trust that whenever Great Britain has to make a similar decision, she will again take the bold, the generous, and the honorable course, and will "engage the enemy more closely," whatever the odds.

In any future war, we cannot expect victory unless there is already in being the machinery for positive command decisions, unity of agreement on military strategy, and a clear-cut delineation of responsibility.

Major General H. M. McClelland

Soviet Staff Training

Translated and digested by the MILITARY REVIEW from an article in "Informations Militaires" (France) 10 June 1949, based on an article by Colonel Leonchenko in "Voennyi Vestnik" (USSR) No. 22, 1946.

ONE of the most important missions of a command is staff training. This mission is most important, for if staffs are not able to function effectively, troops cannot perform properly in combat.

In peacetime, the staff will organize and supervise the training activities of its units and thus perfect itself in the employment of troops on the field of battle. In time of war, a staff co-ordinates the efforts of the different arms and regulates the employment and supply of the troops. These functions indicate the nature of the training which a staff should have.

During the course of the instructional year, which begins in the winter, it is the duty of staff officers to raise the level of their tactical and general qualifications, to increase their understanding of combat employing all arms, and to improve the techniques of staff work. Staff officers must become accustomed to preparing logical plans for all types of combat, to directing the co-ordination of troops in combat, to solving all the tactical and logistical requirements of combat, and to working smoothly with the staffs of other arms and the services in the rear areas.

During the winter period, new officers may be assigned to a staff. For some of them, staff work will be entirely new. For others who come from subordinate staffs, the problem will be a matter of adapting technical abilities to a new and larger framework. Division and regimental commanders, and their chiefs of staff, must take honest stock of their abilities and prepare themselves for their role. In addition, it is the duty of the division and regimental commanders to direct the education of their staffs personally. Combined command and staff exercises are conducted

by the commander of the higher echelon: in the regiment, by the division commander; in the division, by the corps commander. In the regiment, the regimental commander's supply assistant and the regimental chief of staff (executive officer) take part in these exercises; they also personally direct exercises carried out by the officers of the staff in staff techniques and in the operations of the rear services.

Seven different kinds of exercises for the methodical training of staff personnel may be distinguished:

Command exercises.

Staff technique exercises.

Staff war games.

Staff exercises.

Command and staff exercises.

Rear area exercises.

Exercises with troops.

In addition, the knowledge and training of the officers is further advanced by personal study of staff techniques, by working out tactical decisions, and by performing missions of various kinds.

In command exercises, officers start by studying the tactical reasons for the action in a given situation. In the collective staff technique exercises, they study the technique of staff duty and the various obligations of the officers in a staff operation. Later, in staff war games, the director of an exercise sees to it that the officers master the roles assigned them, insures that there is good collective functioning, and prepares them for subsequent staff, and command and staff, exercises. During the period of preparatory and applicatory instruction for troop exercises, the staff acquires the knowledge necessary for the conduct of troops in battle.

Command exercises belong to the general program of officers' training. In addition to staff officers, the battalion adjutants also participate in the exercises.

Collective staff technique exercises train staff officers in their special roles and in staff-service techniques. This is done by executing increasingly complicated tasks. These exercises are intended to lead to more efficient staff functioning. The exercises, therefore, are conducted twice a week under the supervision of the chief of staff. The exercises cover a large number of subjects, for example:

- The plans and details of the exercise.

- Information within and outside the staff.

- The duties of liaison, operations, and duty officers.

- Calculations relative to the employment of all arms.

- Editing reports and documents.

- Editing a combat order.

- Editing documents on the co-ordination of efforts and combat plans.

- Questioning of prisoners.

- Liaison, particularly the use of radio.

- Operations reports.

The same method is employed in the study of the techniques of the rear services. The following subjects are dealt with in this instruction:

- Plans and orders relative to matériel.

- The making of reports.

- Supply and evacuation transportation tables.

- Final reports.

The purpose of staff war games is to train the staff officers and those of the rear organizations in their particular roles, as well as to achieve the smooth functioning of the staffs as a whole. In the case of the regiment, the participating personnel include the regimental staff, the regimental political organization, the commander of the regimental artillery,

the corps commander's supply-assistant, and the service chiefs.

This type of exercise is carried out, usually in a single action, on a map and indoors. The director of the exercise assumes the role of the chief of the adjoining units and of the staff of the higher echelon. The problem is handed, in advance, to those who are to work it out. It contains all the initial data and a notation of the preliminary work to be done before the beginning of the exercise. In order to develop their interest and initiative, the officers are not given any detailed information relative to the work which is to be done or the way in which it is to be done. This requires them to reflect on the situation. The director does not interfere except to explain obscure points. Those charged with working out the problem possess only the part of the information they would possess in reality.

Staff exercises are the principal means of training staffs. These exercises are generally conducted in the field and under conditions approaching reality. In the regiment, the same persons participate in the staff exercises as those who engage in war games. Staff exercises are a practical method for studying deployment, protection of the command post, the organization and execution of reconnaissance, and the techniques of combat paper work. By means of these exercises, skill in the transmission of orders is achieved.

Command and staff exercises are the best form of training for staffs. These exercises may be carried out with the troops, signal facilities, rear organizations, and the enemy being represented. In regimental exercises, the personnel participating will include the artillery command, the signal company, the unmounted scout platoon, battery and battalion commanders and their assistants, and battalion and regimental rear services supply section chiefs. In such exercises, it

is advantageous to mark the location of these services by a few vehicles. The director imposes certain conditions which require intensive effort on the part of those participating. Organization of combat, co-ordination of effort, the conduct of combat and troop supply, and maneuver are studied. It is important to familiarize the staffs and the rear services with different methods of work.

When groups of forces are employed to represent friendly and hostile troops, their movements must correspond to the general situation, to the speed of these movements, and to the actual capabilities of the various arms. Troops representing the enemy must be active.

Rear area exercises and exercises with troops are conducted along the same lines.

All these exercises must be executed in accordance with a program which has been carefully established in advance. The program should include summaries of the tactical problems which will be studied. The training program should be so developed that staffs will be trained to function under combat conditions and the problems will progress from the simple to the complex.

In conformity with the orders of his superior, the chief of staff will prepare two basic documents:

The first document lists the successive problems to be studied. The second gives the dates when the exercises of the following month will be conducted. Experience shows that no less than 4 hours must be devoted to exercises on staff technique.

It is sufficient for a regimental staff to conduct one war game on a map indoors, one staff exercise in the field, three command and staff exercises (one on the division level), one rear area exercise (with staff), and one regimental exercise with the troops. All these exercises can be completed during the winter training period.

It is necessary that the division com-

mander direct the command and staff exercises and set the dates for them. He may, thus, direct two regimental staff exercises before holding his division exercise. It is the division commander's duty to fix the date of the regimental exercises with troops, requiring the participation of the units which he has at his disposal. These last exercises take place toward the end of the winter, that is to say, at a time when the entire regiment may participate. Before this time, the regimental commander must already have directed a staff war game, a command and staff exercise, and a staff exercise. Thus, the regimental commander and his staff will have had to prepare a staff war game, a staff exercise, and a rear area exercise of 24 hours duration, each, in addition to the staff technical exercise.

These exercises cannot be conducted at the same time in all regions, due to differences of climate.

The director of the exercises maintains a record of the results obtained by each officer on the following points:

Degree of technical preparation for staff service.

Comprehension of the essential elements of combat command.

Value of the individual work done.

In addition, a log is kept of the exercises. In the regiment, this document is kept by the first assistant officer of the chief of staff. In the division, the log is kept by one of the officers of the operations section. This log must be brought up to date no later than the day following each exercise.

An examination of these records, if they are regularly kept, will reveal at any given time the degree of preparation of each officer and of the staff as a whole.

Consequently, the log helps to avoid deficiencies and provides a check on staff training.

The German Army, 1919-1939

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel Charles de Cosse-Brissac in "Revue Historique de L'Armée (France) No. 1, 1949.

Prussia is not a State which possesses an Army, but an Army which has conquered a State.—Mirabeau.

War is the national industry of Prussia.—Eighteenth Century axiom.

THE above quotations indicate the essence of German policy, for Prussia became Germany. And Germany was, essentially, a machine for waging of war.

Fichte, drawing a distinction between the "people and the non-people," taught that the German people, subjugated by Napoleon, could find full expression for themselves only through war. Hegel proclaimed the divinity of the state, that "Divine Soil" which could not tolerate another absolute state existing alongside of it. Nietzsche saw no other remedy for the decadence of the Occident than the advent of the "superman," motivated exclusively, "beyond all considerations of good and evil," by the will to acquire power.

These philosophical references are the key to many events. At the beginning of the present century, all Germany was pan-Germanistic. The nation awaited the time when the clock should strike Germany's hour in history. Far from fearing this moment, Germany was eagerly anticipating it.

Everyone knows where this led the Germany of William II.

But how insignificant the first German catastrophe seems today in comparison with the second catastrophe of World War II.

The Armistice was one of those providential opportunities for survival accorded by fate to a Germany which was undeniably vanquished after 4 years of fighting. Thanks to the Armistice, the German Army was able to promote the legend of the "dagger in the back" and to proclaim its invincibility.

The Weimar Republic

In the eyes of the German nation, the Weimar Republic assumed the onus for all of Germany's post-World War I problems: the Versailles Treaty, territorial losses, disarmament, inflation, and ruin. At the same time, this reaction proved the ineptness of the German people in parliamentary processes and started Germany toward a dictatorship.

The Weimar Republic had been lenient toward the survivors of imperial government, but it was not able to modify the underlying structure of the ancient governmental and social institutions. Albert Rivaud pointed out in a course at the *Ecole de Guerre* in 1934 that the three German ministries of foreign affairs, finance, and war, were directed by the same men who served the Second Reich.

As a matter of fact, the common people of Germany had given no evidence of having either the maturity or the ability to relieve the upper classes in the administrative positions of the state. The Junkers of the Army and Eastern Germany, and the leaders of the industrial centers and the great financial organizations, were still in relatively good circumstances. The middle class, meanwhile, ruined by inflation, had descended to the level of the proletariat.

The party which still embraced the aspirations of former Germany was the German National Party directed by Hugenberg. The "Steel Helmet," a large, semimilitary, patriotic association, widened the sphere of this new Party. In order to cloak their indefinite plans for a restoration, this portion of the German electorate had raised to power a man of great prestige, Field Marshal Hinden-

burg, who was already more than 80 years of age.

But time does not reverse its course. The German system had been irrevocably upset in 1918. Not a single personality of the former Germany regained the lime-light. Instead, it was Adolf Hitler who became the leader.

The Advent of Hitler

Before we examine Hitler, let us probe the obscure forces which broke the surface of German history with his advent. However artificial it may have been, the German Revolution of 1918 at least liberated currents of popular self-expression. The financial difficulties of the Weimar Republic brought the middle classes down to the level of the proletariat. Now joined with the laboring classes in common distress, and deceived both by the Marxist formulae and the failure of the former ruling classes, the middle classes were a formidable force ready to be set in motion by any revolutionary movement.

The National Socialist Party preached to these desperate masses a new gospel, the gospel of force developed around the myth of a super race and nation.

Philosophical theories which previously had been expounded by the educated classes were now popularized around some catch-phrase to inflame the masses. Paganism swept away the frail barrier of German Christianity. Taking up the theories of the Frenchman, Gobineau, and of the Englishman, Chamberlain, Rosenberg explained history in his own way—by the conflict of races. The German people, direct heirs of the pure Aryan race, were worthy of ruling the world. To regain their strength, the German people must purge themselves of all foreign contributions and evil influences. Opposed to the Aryans, the argument ran, was the Jewish race, whose representatives, backed by the Weimar administration, had increased their power in all sec-

tors of economic and intellectual life. The Jews were to play the role of the scape-goat.

German philosophy for a long time had been pantheistic. National Socialism based its ethics in the final analysis on the instinct for domination and the struggle for life. On the international plane, it promised to make Germany a "nation of lords." It denounced the "internationalists."

National Socialism closely paralleled Communism, notably its materialism, opportunist dialectics, and the omnipotence of the state as opposed to the rights of the individual. The hostility of national socialism toward Marxism was due less to fundamental opposition than to rivalry over followers.

National Socialism owed its success mainly to the astonishing personality of Adolf Hitler. The question will long be asked whether he was a genius or an insane person. This man of the people—of modest birth, doubtful genealogy, rudimentary education, and uncertain health—had, in fact, failed in everything up to the age of 27 years. Yet this man in a few years became one of the greatest orators and the most absolute war chief and chief of state Germany ever knew.

At heart, Hitler was a pan-Germanist and a warmonger. This dominating trait explains his collusion with so many of the survivors of the Kaiser's government. He found among them the tried and tested cadres he could not as yet find among the rough elements recruited by his Party. The Party purge on 30 June 1934 sealed the tacit pact concluded between Hitler and the old regime. Summary executions eliminated rivals, dangerous opponents, and individuals such as Roehm, who were suspected by the Army.

Hitler and the General Staff

There then began the curious and precarious association between Hitler and

the German General Staff. The association was never intimate or frank, and it was often shaken by sudden and tragic storms.

On becoming German Chancellor on 30 January 1933, following the brief interlude of General von Schleicher, Hitler ended the political role of the *Reichswehr*, which was a potent but unacknowledged force. Hitler broke the high chiefs of the Army who might possibly prove to be rivals—Blomberg, Fritsch, and Beck—first of all. This he did, at times, by heaping honors on them and then dishonoring them; at other times, he simply removed them. The reactions of the General Staff were futile.

To be sure, many generals of the old school attempted to put an end to Hitler's domination. They hatched the bloody and unsuccessful plot of 20 July 1944. But fortune watched over Hitler. Indecision and weakness on the part of foreign powers allowed his first audacious acts to succeed. But when the die was cast, neither soldiers nor patriots dared any longer to oppose him.

Hitler hated, was jealous of, and despised the German generals. In their eyes, he continued to be the "Bohemian corporal" of whom Hindenburg made fun before Hitler became his successor. Hitler could not get along without the aid of the generals, for they were excellent professionals, capable of preparing and executing his plans. As for the generals, they discovered to their amazement that Hitler had a mind that was interested in and informed concerning the great problems of war. Hitler found the time to study under Ludendorf, his companion during the first days of the Party, the great military classics of Frederick II, Napoleon, Clausewitz, Moltke, and Schlieffen. He meditated on military history. He kept up on the most recent innovations, particularly motorization. He showed astonishing intuition. His intuition

caused him to select deliberately the most audacious plans.

On the other hand, Guderian noted glaring gaps in Hitler's military knowledge. Halder observed Hitler's "inability to differentiate between the desirable and the possible, that sort of madness which a philosopher of imperial Rome had already pointed out as the most dangerous." After removing the generals from the field of high military policies, Hitler also supplanted them in the conduct of operations. He ended by taking actual command. He would have been a formidable political strategist, but the gigantic impulses which he transmitted to the Third Reich precipitated Germany into the abyss which swallowed it up.

What trumps did Germany possess on the eve of World War II?

The Army

First, and most important, was the German Army.

When Hitler came to power, the German Army was still only a force limited by the Treaty of Versailles to 100,000 men. It represented a remarkable hotbed of cadres, particularly among the junior officers. It kept alive an excellent officers' corps, steeped in the old military traditions which had been handed down from generation to generation by the *Kriegsakademie* of Prussia since the wars of the First Empire. Vainly dissolved in 1918 by order of Foch, the *Kriegsakademie* remained one of the most outstanding military schools. The effectiveness of its instruction explains the success of the Prusso-German Army during the nineteenth and twentieth centuries.

Doctrine

What were the dominant aspects of the German doctrine of war on the eve of World War II?

From the philosophical standpoint, war was considered the dominant aspect of

politics. Its object was the destruction of the enemy's will to fight. More and more it encompassed the idea of total warfare, for it was directed not only against an enemy's army but against his entire territory and population, making use of the most unconventional methods and weapons. Victory was born of the offensive and fostered in all echelons by the active initiative of the commanders directing operations. At the same time, as Clausewitz indicated, the Germans emphasized the possibilities of exploitation by means of counteroffensive and of attrition and disintegration of an enemy by defensive tactics.

Victory, in the German view, was born of the disequilibrium created usually by a concentration of force at a principal point of axis (*Schwerpunkt*). Surprise insured this disequilibrium decisively, at little cost. German doctrine advocated the frequent utilization of surprise in all its forms—technical, tactical, and strategic.

Strategy

As for strategy, the German school had always stressed the envelopment. The Germans enlarged on the use of the envelopment, stressing the oblique maneuver of Frederick II, the vast envelopment of von Schlieffen, and the double envelopment employed in the battle of Cannae. Schlieffen considered Hannibal's victory at Cannae, which was repeated at Tannenberg in 1914 by Hindenburg and Ludendorff, as a model for strategists. In 1939, the battle of Cannae was still considered the model for a decisive battle—the so-called battle of annihilation, the logical aim of total war. The Germans knew that an adversary would realize the dangers of an envelopment and would attempt to prevent it by extending his front to reach an obstacle such as the sea or a mountain. The Germans then conceived the idea of a break-through of a front

that was too extended or poorly guarded, to be followed by an attempt to roll up the internal flanks of the enemy. To accomplish this, it would be necessary for both German weapons and German tactics to counteract the temporary defensive superiority of the enemy's automatic weapons and artillery.

Tactics

In the tactical field, the lessons of 1918 suggested new methods of employing new weapons. In 1918, the German infantry was both audacious and prudent. It was skillful in firing and accustomed to capitalizing on gaps in an enemy's disposition. Infiltration was rightfully considered a tactical process suitable for overcoming a continuous front. A new weapon, the tank, increased the possibilities of the infantry tenfold. The tank had three advantages favorable to obtaining shock and surprise: speed, protection, and fire power. A school of thought, represented by Eimannsberger, an Austrian, and Guderian, revitalized the doctrine of tank employment. Surprised at the timidity of the Allies in 1918, they considered the tank not only a break-through weapon but an ideal tool for exploitation. Even further, the tank was injected into the principle of inter-arms co-operation. As a result, the *Panzer* Division became a large, motorized, all-arms unit, capable of engaging in combat independently by means of crushing, massed concentrations on judiciously chosen, narrow fronts.

The German Army was not isolated from the nation. All Germans, whatever their class or profession, have always worshipped military activities. Hence, the physical and psychological preparation of the German youth and the entire German people assumed great importance to the Nazi Party. This preparation began in the schools and continued later in the numerous para-military formations of the Party: the Labor Service, the Storm

Troopers, the Elite Guard, the Nazi Party Motor Corps (NSKK).

The NSKK reflected the great importance Hitler attached to motorization. The NSKK grouped some 500,000 adherents under a trusted official with the rank of brigadier general. It included German motorists using their own vehicles. It assumed the responsibility for the technical and military training of motorists and, if necessary, their mobilization. It organized numerous sports contests of a military nature, such as motor vehicle concentrations, long-distance runs in convoy, and cross-country automobile or motorcycle races over all kinds of terrain and in all seasons, by day and by night, with orientation by map and compass.

War Economy

In addition, the entire German economy was organized with war in view. It had profited by successive devaluations of the mark and modernized its plants with capital generously supplied from abroad. The economy was speeded up and made more efficient by using American methods. It built the largest and most modern factories on the Continent. It specialized in the manufacture of finished iron and aluminum products, including machine tools, motor vehicles, and planes. Its optical and chemical industries were the finest in the world.

Because of a cleverly organized "dumping" program, Central and Eastern Europe became more and more dependent on German economy. An enormous effort was made to standardize motor vehicle and replacement production. Although rich in coal, Germany had to import iron ore from Lorraine and Sweden, and bauxite from France and Italy. Germany also lacked such items as nickel, chrome, manganese, oil, and grease.

The German financial organization became the docile instrument of this colossal economic expansion. It had arisen

healthy and fresh from the crisis in which the Weimar Republic had struggled. At the beginning of the Nazi experiment, the public debt was insignificant, and this permitted inflation. German finance was practically independent of gold and the principal monetary units. It was directed by skilled financiers.

The German economy, therefore, was already mobilized. Even in time of peace, it was a veritable war economy. By systematically restraining the production and importation of consumers' goods, the Nazis contributed to the hardening of the German people. The Party persuaded the German people that, in spite of its merits, Germany was an unfavored nation whose only recourse was conquest if the nation were to improve its existence. By dint of an effort theretofore unequalled in the history of Europe, Germany in 6 years rearmed its Army, Navy, and Air Force with ultra-modern matériel. In September 1939, Hitler estimated the value of the nation's effort at 90 billion marks.

German policy was a war policy, even in time of peace. Hitler admitted that Germany was governed only by what served the interests of the German people. Its agreements became null and void as soon as they ceased to be useful. Like the Marxists, Hitler appealed to a stirring argument that disregarded justice or ethics.

At the high level where policy and strategy meet, Hitler appeared for a long time to be greatly concerned that Germany should be faced with war on two fronts. The German strategists were still haunted by memories of World War I. With Machiavelian art, Hitler diplomatically isolated his chosen victims, one after the other; he surrounded them strategically in time of peace, and he exploited their germs of internal disintegration.

Plan for Domination

Hitler's plan for European domination consisted of successively well-defined steps. First, he sought to liberate his country from the fetters of the Versailles Treaty, and then to rearm Germany. After this, he determined to regain former German states, and to obtain living-space for the German people.

The enlargement of the German area was seen by Hitler, not in the colonies, but in the vast Ukrainian Plain. There, a great Nordic people of 200 million Germans could expand in the shelter of natural barriers such as the Volga or the Urals. This expansion eastward was not possible, however, it was stated in *Mein Kampf*, unless the German rear were protected by first crushing France, the traditional enemy of Germany. Strategic guarantees must be obtained against England, which he considered a Germanic nation that must be conciliated, and whose supremacy of the seas must not be disturbed.

General de Gaulle has said: "The history of a war begins in time of peace." The principal dates in Hitler's career show the sequence of events leading to World War II.

Hitler's Chronology

On 30 January 1933, Marshal Hindenburg called Hitler to power. The *Reichstag* was dissolved and then re-elected; it then granted full powers to Hitler, who immediately took advantage of them to establish a dictatorship.

In October 1933, Hitler left the League of Nations.

On 30 June 1934, he brutally purged the opposition party.

On 1 August 1934, on the death of Hindenburg, Hitler took upon himself the powers of Chancellor and President.

On 13 January 1935, a plebiscite restored the Sarre to Germany.

On 9 March 1935, Hitler announced the reconstitution of the German Air Force and, on 12 March, the reinstitution of compulsory military service for 1 year's time, which was to be doubled the following year. The new Army of the Reich was to comprise 12 Army Corps and 31 infantry divisions. This was unilateral repudiation of the military clauses of the Versailles Treaty.

On 18 June 1935, an Anglo-German agreement signed in London authorized Hitler to bring the German Fleet up to 35 percent of the strength of the English Fleet.

On 7 March 1936, Hitler occupied the Rhineland.

On 1 November 1936, Mussolini saluted "the vertical axis of Europe, passing through Rome and Berlin." From then until 1944, Italy was under German influence.

On 25 November 1936, the Anti-Comintern Pact extended to Japan the association of dictator states.

The year 1937 was filled by the Spanish Civil War, forerunner of the next world conflict. The Italians and the Germans sustained Franco's Spain; the Russians, with the aid of the international brigades, supported the Loyalists. Behind the screen of ideologies, the principal interest of the Civil War was experimentation with new weapons and tactics.

In 1938, the drama became more localized. Hitler, aware of the lack of psychological and material preparation of his future adversaries, saw the need of outdistancing them.

On 4 February 1938, he purged the German General Staff, dismissing simultaneously, under various pretenses, Marshal von Blomberg, General von Fritsch, and others whom he felt to be hostile to his policy but whom he was obliged to take back when the War began. At least three of these became marshals: von Leeb, von Witzleben, and von Kleist. The

second was hung, however, after the failure of the *coup d'état* in the summer of 1944.

On 13 March 1938, after the shameless blackmailing of Chancellor Schuschnigg, Hitler invaded Austria and proclaimed the *Anschluss*:

The Czech government, by the assertion of Benes himself, had more than once proclaimed that it did not consider such an annexation anything more than a manifestation of internal policy on the part of two states of the same language and race. It was not to be long before he realized the consequences. They were written on the map. From that time, the Czechs were menaced on three sides.

At Munich, on the night of 29-30 September, France and England, aware of their lack of military preparation, abandoned Czechoslovakia. Simultaneously,

she was deprived by Poland of the territory of Teschen. The cession of the Sudeten completed the destruction of the Bohemian defense.

Hitler did not fail to exploit the heterogeneity of the Czechoslovak state. He supported Slovakian autonomy, and when Slovakia proclaimed its independence, Bohemia lost its own to Hitler. On 15 March 1939, the German army occupied, without firing a shot, the territory of Bohemia—Moravia.

On 22 March, Lithuania was forced to cede Memel.

And now, after Austria and Czechoslovakia, it was Poland's turn. Wedged between Germany and Russia, Poland faced catastrophe when the German-Russian non-aggression pact was signed on 23 August 1939.

Atomic Bombing and Biological Warfare

Digested by the MILITARY REVIEW from an article by Major R. B. Forrestal in "The Journal of the Royal Artillery" (Great Britain) October 1949.

THE two atomic bombs dropped by the United States Air Force towards the end of World War II on Hiroshima and Nagasaki killed approximately 70,000 and 35,000 of the population of these two cities respectively.

Large areas of these cities were levelled to the ground, and the possibility of similar attacks on Tokyo and other cities was largely instrumental in hastening the unconditional surrender of the Japanese government.

To appreciate the true significance of the damage and casualties caused in these two raids, it is necessary to compare these figures with the total civilian casualties throughout the war in Britain, Germany, and Japan, together with the tonnage of bombs dropped on the three countries.

In Britain, approximately 70,000 tons of bombs were dropped, killing 60,000 people.

In Germany, 1,200,000 tons were dropped, killing at least 350,000 of the population, while in Japan, 150,000 tons caused from 250,000 to 300,000 deaths.

It will be seen that, in proportion to the tonnage of bombs dropped, Japan suffered much the greater civilian casualties. But it is significant that over one-third of these casualties were caused by the two atomic bombs dropped by two single aircraft.

At this stage, it must be clearly appreciated that the atomic bomb casualties suffered at Hiroshima and Nagasaki were to some extent due to an inadequate civil defense organization, with resulting lack of warning, shelters, and medical atten-

tion. This must be coupled with the complete lack of knowledge by the Japanese people of the existence and use of the bomb.

When the first bomb was dropped on Hiroshima by a single Superfortress, the inhabitants did not even bother to take cover. The bomb was burst in the air and the result was appalling.

Effects of Atomic Bombs

It is possibly advisable at this stage to examine the major effects of the atomic bomb.

The first and possibly the most alarming is radio activity, which is in effect an overdose of X-ray. Although from an airburst bomb the residual effect is negligible, from a ground or a low burst the effect is persistent and would appear to last a very long time indeed.

The protection against radio activity is extremely difficult, and at Bikini, where a trial bomb was dropped, radio activity was so persistent as to render impossible the close examination of its effects, with any degree of safety, till almost a month had elapsed.

The second effect is the flash burn. This is momentary but causes intense heat with highly lethal effect in the immediate vicinity and causes so many primary fires that the danger of a fire-storm is highly probable. The protection against flash burn, however, is comparatively easy, and it was found that a shadow had given protection to both people and buildings in the two Japanese cities.

The third effect is that of blast. This is downwards and explains why an airburst bomb was used in the two raids. Blast did in fact cause the greatest damage to buildings and installations.

Having regard then, to the three main effects of the atomic bomb, it seems most probable that in the future the war effort of a nation will be directed increas-

ingly against the morale of its opponent.

It is agreed that the effect of the atomic bomb on modern cities is still largely guesswork, but, having regard to the damage caused by only two atomic bombs compared with the deaths and damage caused by the total tonnage of other bombs dropped, it would appear that decisive results would be possible against a highly industrialized state by atomic bombing and biological warfare, only.

Biological Warfare

The coupling of biological warfare with atomic bombing can now be examined.

Biological warfare has not as yet been carried out on any scale which would enable its results to be examined with any degree of value or accuracy. The advent, however, of the atomic bomb has opened up new possibilities regarding its subsequent use.

The type of biological warfare which any enemy is likely to use would be difficult to anticipate. Intelligence might not discover the enemy's decision to use biological warfare, and the first warning might come when this form of warfare was first used in a raid.

It will be appreciated that whatever the effect of the atomic bomb on the morale of the people, the result is almost certain to be great devastation, with a corresponding disorganization of essential services. It would be at such a stage that the enemy could launch a biological warfare attack, with the prospect of further demoralizing the population. Unless some inkling of the type of biological warfare to be used had been received, training in countermeasures would have been severely limited, with the resulting lack of efficiency in dealing with this new threat.

In a future war, the enemy might launch his attack without any formal declaration of war or warning of attack.



These two captured Japanese photographs show the desolation which resulted from the atomic bomb explosion at Nagasaki in August 1945. Above, some of the survivors walking through one of the hardest hit areas of the city. Below, a group of Japanese soldiers rummaging through some of the ruins left in the wake of the blast.—US Army photos.



The fact of having air superiority to launch a saturation raid does not now arise, as a single aircraft can launch the atomic bomb. Indeed, the time will probably come when guided missiles, rockets, or V-1 types will be used to launch the attack.

The question now arises: Could any civilian civil defense organization deal with the scale of devastation and casualties which would arise?

In a highly industrialized state, it would be essential that the industrial potential of the state be maintained if the war is to be carried to its successful conclusion.

It must be assumed that the enemy's objectives, either civil industrial population of a vital area or isolated key points (transport, oil storage, etc.) have been listed. In a state which is highly industrialized, however, the number of such areas and key points would be considerable. However efficient the civil defense system, the strain on man power in providing an organization which could restore some or all of the industrial capacity of the stricken areas might be immense.

Furthermore, following such a raid, the morale of the civilians would need to be retained by means of the following:

1. A system of evacuation of large numbers of the population to reception camps which would include housing, feeding, and ultimate transport of the workers to their respective centers of occupation.
2. An efficient organization for the rescue of trapped and injured persons.
3. A well organized health service to act and thus allay alarm in the case of biological warfare.

Man power consideration tends to make the organization of a civil defense service largely on a voluntary basis. However efficient the organization, it could hardly be expected to deal alone with a sudden

and prolonged attack, or series of attacks, without seriously interfering with the industrial potential of the state.

Prior to any attack, however, it might be expected that a state of emergency exists. Accordingly, the army might be partially or fully mobilized, but not so a predominantly voluntary civil defense organization.

Role of the Army

If, as it therefore appears, decisive results might be obtained by atomic bombing and biological warfare alone, then the role of the army, if not actually changing, might at least have to be extended to implement the civil defense organization in the opening stages and possibly throughout the war.

It must be clearly understood, however, that passive defense alone would be no answer. It would not be possible to withstand a long period of destruction by atomic warfare. Retaliation is essential and must be immediate.

There are two possible aspects of the army's task.

First, assistance to the civil defense in the event of the latter's partial inability to compete with raid damage.

Second, complete take over from the civil defense organization of the command and control of civil defense operations both during and following the raid.

It must be clearly understood, however, that a complete take over should only be considered in the case of severe casualties to civil defense staffs and personnel, or in the event of civil defense not being mobilized or adequately trained.

To cope with such a problem, it is obvious that whatever the future role of the army, training at least in civil defense must be carried out by every unit. Bearing in mind that a strong striking force will always be necessary to launch an attack against the enemy with the least possible delay, it is imperative that the

territorial army should play a big part in this scheme.

To augment the civil defense organization throughout the state, it could then be possible to form groups, possibly of brigade strength, of the regular and territorial army near each vital area, with small groups near isolated key points.

A role of these groups could be to augment the local civil defense organization. Should any formation leave the area, say for overseas, then it would be the army's responsibility to ensure that another group would take its place.

Such army brigades or groups would not only have local knowledge but might be expected to mobilize near the area or key point for which they are responsible.

It would be essential for the national servicemen in regular formations to receive some civil defense training so that the territorial army formation, which received them for the rest of their service, would have a large proportion of their personnel reasonably trained. It is too much to hope that the territorial army, with its very limited number of training hours, can be expected to carry out the complete training of the national serviceman in civil defense. This is particularly emphasized when the priority tasks which may have to be undertaken by the army immediately after a raid are examined.

These vary from reconnaissance, both from the ground and air, of the stricken area, to the recovery and disposal of corpses.

They include the control of refugees; the clearance of roads to the center of the damage; first aid and stretcher bearing; rescue work; transportation; housing and feeding refugees; and repairs to public utilities.

Other tasks in which the army might be required to render assistance are:

- Emergency lighting for rescue work.
- Elementary fire fighting.

Hygiene, including the supply of drinking water.

Decontamination in all its aspects.

Salvage, from personal and household belongings to industrial plant and machinery.

Demolitions.

The training for all these tasks must obviously be co-ordinated on the highest level, and it is necessary that commanders and their staffs should attend the appropriate instruction centers. Liaison with the local civil authorities must be accomplished at the earliest possible date.

In the case of territorial army units, all officers and senior NCO's should have a sound knowledge of local geography, including shelters and communications, and should have carried out close liaison with the local civil defense organization, and heads of public utilities.

The civil defense role required of the army, therefore, embraces a wide variety, from the vast problem of initiating the clearance of a devastated area without any help from civil defense down to the provision of a number of rescue teams to reinforce existing personnel.

The job may be simple, such as cordoning the exits from a stricken area in order to ensure early evacuation to pre-arranged refugee camps, or it may mean the provision by at least a brigade group of a number of fire-fighting teams, the erection of biological warfare cleansing centers, squads for repairs to electricity and water installations, the running of motor transport services, the erection of first aid posts and the furnishing of hundreds of stretcher bearers to carry casualties across vast areas of rubble.

In conclusion, it must be appreciated that the primary role of the army—which is to defeat the enemy—must not change.

It is equally obvious, however, that as a secondary role the army must be prepared to assist in a civil defense role.

German Air Defense in World War II

Translated and digested by the MILITARY REVIEW from an article by H. Aldinger, former colonel in the German Antiaircraft Command, in "Flugwehr und -Technik" (Switzerland) November 1949.

THE organization of the German air defense at the end of World War II was the result of technical developments and the many, hard-won experiences that aerial warfare brought to Germany. This organization can be fully comprehended only on the basis of its development during the War.

First Phase of Aerial War

At the beginning of the War, the following means were available to the German air defense:

1. Fighters, mostly *Me 109* day fighters. These were used in squadrons of 12 planes each with three squadrons making up a group. A centralized fighter command such as had been developed by the end of the War did not exist as yet. Some 50 groups were available, half of which were used in the defense of Germany while the rest were used for direct support of the Army.

2. Heavy *Flak* artillery, equipped with 8.8-cm and 10.5-cm guns. Fire direction was achieved through the use of Fire Control Apparatus No. 36 or emergency fire control apparatus. Every battery possessed four guns at that time. The batteries were combined into so-called mixed *Flak* battalions of three heavy and two light batteries. The *Flak* system was based on:

- a. Locating (optical or, when necessary, acoustic).

- b. Conversion of the measurements, or of the measurement tendencies in a fire-control device, into lead calculations, making use of the so-called future flying-time.

- c. Transmission of the lead values to the guns by telephone or an electrical data transmission system.

- d. The firing of shells from the gun aimed in accordance with the lead calcu-

lations, without any possibility of influencing the course of the shell after firing the gun.

Before the mobilization, there were about 80 heavy batteries in existence. This number was tripled on mobilization. The active, motorized batteries were employed in connection with the Army, while the newly organized, non-motorized units were used in the protection of the home theater of operations. In Germany, the antiaircraft artillery battalions were employed either independently or under the control of the staffs of antiaircraft artillery regiments. The connection with a regimental staff was not necessarily permanent, however. Changes of position were made by using truck batteries. Such an organization was able to move an entire antiaircraft battalion in one move.

The antiaircraft artillery battalions employed in connection with the Army were under the orders of so-called Commando Air Staffs with the armies, or they were temporarily assigned to individual army divisions, particularly armored divisions.

3. Light Antiaircraft Artillery, equipped with 2-cm or 3.7-cm guns. The batteries were either combined with heavy batteries in a mixed antiaircraft artillery battalion or made up into battalions of one 3.7-cm battery and two 2-cm batteries each. The mobile units were in part motorized on self-propelled mounts. They were employed, principally, in connection with the Army (about 40 batteries). Those mobile units which had already been organized when mobilization occurred, like the mobile units of the heavy antiaircraft artillery, were employed in the home theater of operations for the protection of vital objects. They were equipped with

gun sights which made it possible, with rough adjustment, to fire with approximately the correct lead. For night firing, 60-cm searchlights were assigned to them.

4. Antiaircraft artillery searchlight sets, equipped with 150-cm searchlights and trumpet-type sound locators. The searchlight battalions consisted of three batteries of 12 searchlights with one sound locator in each battery. They were employed almost exclusively for the protection of vital objectives. They were all motorized.

5. Barrage balloon detachments, equipped with barrage balloons capable of attaining a height of about 10,000 feet and, in individual cases, with kites capable of rising to about 20,000 feet. There were 12, later 24, ascension positions per battery.

6. Aircraft warning service, a more or less closely woven observation network of aircraft warning posts with control centers, to which observations were transmitted by telephone. Observation posts with personnel equipped with field glasses were maintained. The control centers gave the air raid warning for the civilian population air defense units. The interval between the air-raid warning posts was, on an average, a little over 6 miles.

Tactical Organization

The tactical organization of the anti-aircraft defense was as follows: All the above mentioned types of weapons, in contrast with the other branches of the service, were under the control of the Air Force. Germany was divided into Air Force administrative commands whose size corresponded to the constituent states. These organizations had command over the operations of the fighter and *Flak* units allotted them by the Supreme Command of the *Luftwaffe*. The fighters operated in accordance with reports received from the Aircraft Warning Service. The fighters were allotted by the Supreme Command of the *Luftwaffe*, so that their points of

greatest concentration were in the Air Force administrative commands in the West and on the coast of the North Sea.

The *Flak* forces operated according to an air-defense card file and in a manner corresponding to the military importance of the objectives listed in the card file. At special strong points, air defense commands were established which had both fighters and *Flak* at their disposal. These were the first purely air-defense staffs in contrast to the Air Force administrative command staffs, which had numerous territorial missions in addition to command missions.

Barrage balloon detachments followed the instructions of the *Luftwaffe* High Command in the case of especially important probable air attack objectives which required protection. They were used principally against low-flying attacks.

In the West, a so-called air defense zone had been created in which a sort of barricade had been established by means of *Flak*. Its length was about 120 miles, but it was very narrow. In addition to its mission of air defense, it had the secondary mission of serving as a barricade in the event of ground operations. It proved to be of little value.

Lessons Learned

The German fighter defense proved to be excellent during the initial stage of the War. The few weak Allied formations which did attack were detected in sufficient time, broken up, and the separate components destroyed.

In the case of individual aircraft, especially when they appeared at great heights and made use of unfavorable weather conditions, imperfections in the German system were apparent from the very outset. This applied both to the air warning service and the *Flak*. In the case of the *Flak*, the following difficulties began to manifest themselves, becoming

progressively more serious as the War continued.

1. With increasing target speed and altitude, target location, which was the foundation of the whole combat system, was rendered extremely difficult or impossible. This was particularly true in the case of night attacks and when Allied planes approached above the clouds.

2. With increasing target speed and height, the period of combat became increasingly shorter, the amount of target lead required became greater and greater and, accordingly, antiaircraft artillery fire became more inaccurate.

3. The above described *Flak* system at times permitted attacking a target with only one battery. Every change of target required a great deal of time, considering the speed of the planes.

4. Due to the growing invulnerability of the planes, the effects of German high-explosive projectiles became inadequate.

5. Because of the limited number of *Flak* units—especially in the beginning—and the consequent long distance between positions, there was very little co-operation between batteries. The range of their guns did not permit it. Fire direction by the battalions or the regimental staffs was not practicable, because of the impossibility of target assignment and the lack of knowledge of the local air situation at the moment.

6. Only limited attacks could be carried out against aircraft when they employed evasive action.

Lack of Control

It must be noted that the *Flak* staffs of all grades were, mainly, supply service and administrative staffs. Their activity in combat was limited to fixing the disposition of the batteries, giving orders to fire or not to fire, and to supervising training. Intervention during combat was not possible. Distribution or concentration of fire was, therefore, impossible.

The searchlight units found little to do in the first phase of the War, as the Allies did not begin night attacks on any large scale until 1940. Sound locating showed, from the very beginning, its already known lack of accuracy.

It is very difficult to estimate the effectiveness of the efforts of the barrage balloon units. Very few planes were brought down by them, but they must certainly have exerted a restraining influence at the beginning of the War. Later, the low altitude to which they rose could hardly have had any appreciable effect on Allied intentions.

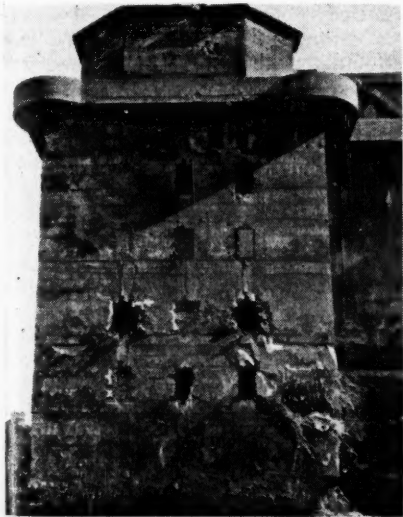
The aircraft warning service, however, operated with gratifying success from the very first. Its principal lack was, however, the relative slowness of its action, which gave it the appearance of being useful only for orientation concerning the general air situation. An interpretation of its reports would not provide a "momentary" picture of the air situation for use by fighter or *Flak* commands during a battle. Its technical equipment was not sufficient. However, during the first phase of the War, it was able to provide information for prompt alerting of both fighters and *Flak* as well as for effecting the general air raid alarms for the civilian population.

On the front, the *Luftwaffe* was superior in the early phase of the war. The few Allied planes appearing in the Polish and French campaigns were attacked successfully by the *Luftwaffe*. The light *Flak* was extremely effective against low-flying planes. Allied planes were not able to launch decisive attacks against armored formations, bridges, or railway centers on the rear communication routes.

Great difficulties were encountered, however, relative to the organization of the *Flak* units. As already mentioned, these were either temporarily assigned to individual army units or, with respect to employment and troop service, placed



This *Messerschmidt 110*, above, captured by the British in 1942, is an example of the planes used by the Germans in air defense. Below, left, a Berlin *Flak* tower which the Germans used as an anti-aircraft gun mount; the picture was taken during demolition in 1947. Below, right, shrapnel marks inside a B-25 brought down by *Flak*.



under the orders of the so-called headquarters air staffs of the Army. As a result, there was continual friction relative to employment and supply between the Army and *Luftwaffe* authorities. Because of the great distances involved, the headquarters air staffs were not capable of exercising command while the ground situation was rapidly changing. This led to tactical errors. The supply service was inadequate. This led to the formation of antiaircraft artillery corps staffs. Due to their excellent signal communication equipment and vehicles, these staffs maintained contacts, acquired supplies, and, above all, insured concentration of effort on the part of the antiaircraft artillery by preventing a loss of strength through its use in ground combat missions. This latter was the case when army antiaircraft artillery units under the orders of the Army only were assigned to certain divisions or army formations.

Second Phase of Aerial Battle

The second phase of the aerial battle was characterized by Allied night attacks of gradually increasing intensity. Previous German experiences, and the use of night-operating aircraft by the Allies, led to the following development on the German side:

1. Fighter formations: Creation of the XII Night-Fighter Corps. This operated at first in conjunction with searchlights. A searchlight barricade was formed on the northwestern German frontier. It soon became evident that, even with the intensive employment of searchlights, such a "bright zone" was crossed relatively speedily and, in any case, was inadequate from the point of view of the time it afforded the German night fighters to attack the Allied formations. In addition, the "bright zone" was very quickly detected by the Allies and by-passed. Therefore, the XII Corps quickly changed over to escorted night flying with electrical

locating instruments, which had reached the stage of development where they could be used. By means of these locating instruments, German fighters were guided toward the Allied planes until a point was reached where the night fighters were able to find and attack their opponent with their own instruments. The feature that was entirely new here was the fact that an accurate "momentary" picture of the air situation was created for the first time by means of electrical locating and an extensive signal communication network.

The system still had the following disadvantages, however: Each instrument could guide only one night fighter; the air picture was based on a large number of individual reports with a small time-gap between reports; the air picture was not complete if one Allied plane was not included—a thing which began to occur as the Allied attacks became more numerous.

But in spite of these defects, and especially at the beginning, this system worked out quite successfully from the standpoint of defense.

2. Antiaircraft artillery: In the case of antiaircraft artillery in Germany or in the out-lying occupied areas—*Flak* artillery for the protection of vital targets—an effort was made to compensate for the defects which had appeared by accomplishing the following:

- a. Improving target location through the introduction of electrical locating.

- b. Improving data computers; the new Model 40 data computer was highly automatic.

- c. Increasing gun calibers; 10.5-cm 12.8-cm, and 15-cm guns were constructed.

- d. Making the guns automatic by employing automatic ammunition feeds and motorized pointing.

- e. Introducing the use of twin-barreled guns (four-barreled guns with the light antiaircraft artillery) and large

batteries with as many as 12 guns, to increase fire concentrations.

f. Introducing better data-transmission apparatus through follow-the-pointer sight mechanisms, in place of electric light transmission.

g. Creating heavy battalions of four batteries each instead of three, as theretofore.

h. Forming locally fixed batteries.

i. Creating new units on an extensive scale.

All these numerous and ingenious improvements did not alter in the least, however, the fundamental difficulties in locating, lead calculation, and the firing of projectiles with fixed trajectories. In spite of attempts to attain increased efficiency, the following fundamental defects remained: each battery had to locate the Allied planes for itself; lead calculation, in spite of the best of equipment, was only moderately accurate; fire direction in combat, due to insufficient ranges and lack of an up to the minute picture of the air situation, was impossible.

There were other difficulties which also interfered with defense activities. The extensive creation of new units occasioned a continual change in battery personnel and prevented the fusion of the units into the closely knit group that is necessary for operation against aerial targets. The quality of the incoming personnel, both officers and men, was progressively lowered. The complexity of the equipment stood in sharp contrast to this.

Moreover, the Allies attempted by various means to render the German defense ineffective. For example, the dropping of strips of tinfoil interfered greatly with radar detection. In addition, the Allies attempted to reduce German defense possibilities to a minimum by concentrating attacks in time and space.

As regards the creation of locally fixed batteries, an effort was made to bring the Allies face to face with new defense situa-

tions by changing the location of batteries. This led, however, in the course of time, to a situation wherein the battery positions were changed very frequently when the old positions became known and came under frequent attack. Frequently, these changes of position were merely an indication of the nervousness of the higher staffs. In order to counteract this, as well as to save equipment, locally fixed batteries with guns on pedestal mounts were created. The increasingly threatening air situation made it necessary, however, to shift even the positions of the pedestal-mounted batteries. On the other hand, the hoped-for saving of equipment was small. Toward the end of the War, when the Allied ground forces were closing in on Germany, these pedestal-mounted batteries could not be used in ground defense, since they were not mobile. Valuable defense equipment had to go unused, and the idea of the pedestal-mounted batteries proved quite costly.

Moreover, since the staffs of the Air Force administrative commands proved incapable of satisfactorily commanding the *Flak* units that were placed under their orders, antiaircraft artillery division staffs were formed. These staffs had charge of training, new units, supply, and co-operation with fighter formations. They proved successful, but even these staffs were unable to exercise full command during combat.

Third Phase of Aerial War

The third phase of the aerial war was characterized by the mass night attacks of the Allied air fleets and by nuisance attacks at night by individual, fast, and highly maneuverable planes. The characteristic features of the mass night attacks were extreme concentration.

The defects in the defense system already described now became extremely apparent in the face of the new tactics.

1. Fighters: The massed attacks hin-

dered adequate defense tactics on the part of the German night-fighters, which were guided individually to the Allied planes. A change was therefore made to the practice of sending out night fighters in as great numbers as possible. They went into the stream of Allied bombers and located and attacked the enemy aircraft by using their own locating instruments and weapons. The results were good.

When points of main attack were discerned, an effort was made to establish a local night-fighter defense over the area in question. During an attack, individual night fighters attempted to locate and attack the enemy by watching for *Flak* fire, searchlight activity, and the signal flares dropped by the Allies. This method was fairly successful, but its effectiveness was left to chance, since the choice of the attack objective occurred only at the last moment. Weather conditions and visibility played a decisive role, and the activity of individual fighters on the basis of chance locating could never avert a concentrated attack.

It must, therefore, be realized that, as opposed to the concentrated attacks, no concentrated fighter defense could be offered, partly because of lack of forces, partly because of the absence of adequate control means.

2. *Flak*: The same is true of the *Flak* defense. In spite of mass employment of guns and ammunition, *Flak* fire continued to be individual battery fire, dependent for its effectiveness on the individual performance of the units. It was impossible to concentrate fire because of the lack of the necessary technical equipment. Only toward the end of the War, when hundreds of antiaircraft artillery guns were stationed around a single small target, did fire concentration reach the point where the *Flak* achieved decisive results.

New Developments

An effort was made to deal with the in-

creasingly obsolete German *Flak* system by developing new and improved equipment. Included in these developments were new radar units, computers, antiaircraft rockets, and larger explosive charges.

All these various items of equipment were in use by the troops by the end of the War, either in a perfected or experimental form. After surmounting initial difficulties, their introduction would have placed air defense on an entirely new basis and have improved its effectiveness. But the end of the War prevented this.

The co-operation between fighters and *Flak* had, through force of circumstances, so developed that fighters and *Flak* could attack or assume the defensive simultaneously. Separation of activity by zones or altitudes was abandoned more and more, the occasional shooting down of a German plane being accepted as inevitable.

Fourth and Last Phase

The final phase was characterized by mass night attacks and by mass daylight attacks. Toward the end, there was also increased activity by low-flying planes, which caused disruption of railway and highway transportation. This phase began simultaneously with the landing in Northern France.

As regards defense from the air, a new situation was created in that the daylight formations had to be attacked for the protection of the homeland. The numerical weakness of the German formations in comparison with the vastly superior Allied formations necessitated a centralized fighter command. The Allied planes now flew with protective escort, the development of long-range fighters having made possible the daylight employment of bombers.

Since the fighting front, in the meantime, had moved very close to Germany itself, a local concentration of German fighter defense, such as existed at the beginning of the War in the western and

northwestern part of Germany, could no longer be effected. Allied attacks had to be expected from every point of the compass. This all-around threat often made it necessary to call the planes out under all sorts of weather conditions and from widely separated places.

Frequently, the command did not succeed in sending all formations against the Allies at the same time, with the result that weak German formations met a superior enemy and suffered heavy losses. It sometimes happened that the German fighters met the Allies only after a long fight and were obliged to break off contact because of lack of fuel. Often the German planes did not find the Allies at all, the latter's objective having been incorrectly judged and the assembly point of the fighters having been incorrectly chosen as a result. Occasional defense successes could not hide the fact that the German fighters, because of their numerical inferiority, were hopelessly inferior. Even by the autumn of 1944, it was seldom that 700 German fighters were available for use.

Meanwhile, the Allies made numerous daylight attacks in which more than 1,000 planes were used. The increasing demolition of ground installations added to the difficulties. Even the introduction of jet fighters came too late to be of any help, since the number available was too small. More important, the German formations were crippled by fuel shortages.

As to the daylight attacks, the locating of targets for *Flak* was now easier, but the basic defects of the *Flak* defense system still remained. Antiaircraft rockets were not employed by German troops until the spring of 1945. Also, the ammunition shortage was becoming more and more serious. The change from time to impact fuses gave good results.

On the front, Allied air superiority was just as devastating in its results as in the interior of Germany. The lack of

fighters put the burden of air defense more and more on the *Flak* which, however, was numerically too weak. It is worth noting that, in light antiaircraft artillery, the antiaircraft sight moved more and more into the background. Firing was conducted mainly by observation with tracer ammunition.

Conclusions

When we compare the organization of the various categories of air defense at the beginning of the War with their organization at the end of the War, we note that night fighting had become at least as important as day fighting. The number of night-fighter formations and their internal organization into squadrons and groups had not changed. The pressing need of reinforcement of the fighter arm had not been met, due to the fact that in 1941 air equipment had been assigned only fourth or fifth place in order of armament priority. The decision was one for which a bitter price was paid.

Night-fighter operations were not too successful because of the lack of command functions. The centralized command of the day-fighter operations at the end of the War was correct; yet it could not be fully tested, due to numerical weakness.

Technical developments, culminating in the jet-propelled fighter, were outstanding, but they came too late to be decisive.

In the case of *Flak*, the conclusion clearly must be drawn that the method of firing guns at flying targets, using a calculated lead, is no longer adequate. Since the advent of jet-propelled aircraft, the ranges of the guns, and the associated time period in which the targets may be attacked by a battery, are too small. Even an extraordinary increase in the number of batteries and the numerous technical improvements could not have altered this situation. Only new radar apparatus and *Flak* rockets were capable of producing a change here.

As regards command, the grouping of *Flak* under its own higher staffs proved very successful in the War. Its original subordination to the Air Force administrative command staffs, which were limited to specific areas, was not successful.

As regards the race between the attack and the defense, it must be noted that the attack developments prevailed, despite

many improvements in defense. However, technical innovations point to a further development of the defense, so the far-reaching domination of the attack may be brought to a halt. If everything is done to bring about tactical concentration of forces, in contrast to the situation during the War, this goal may be reached.

Russia and Her Navy

Digested by the MILITARY REVIEW from an article in "The Navy" (Great Britain) December 1949.

ONE of the more remarkable characteristics of the history of the Russian Navy is the lack of continuity in its development and the occasional disastrous interruptions to that development with which it has been afflicted. In its early days, its prosperity and the amount of attention devoted to it depended largely on the interest in naval affairs of the reigning sovereign. Later, its efficiency was at times allowed to decline because money was not provided to counteract obsolescence of its material and the adoption of new improvements by other navies.

Imperial Tradition

Although the Russian fleet had risen Phoenix-like from its Far Eastern ashes by the time of the outbreak of World War I, by the end of it the Fleet had been broken up by enemy action, internal political convulsions, and civil war. Part of it was even in voluntary internment in a foreign port and the new government of Russia had to begin again to train ships' companies with only a handful of survivors among those who had experience as officers or warrant officers in the Imperial Navy. The tendency of the Soviets at first was to effect a complete breach with the past and build a new Russia without any conception of existence before the October Revolution. It is interesting to

note now, however, that the names of seamen and the memories of gallant episodes in naval history are used as a foundation for rebuilding a Russian naval tradition.

Although Russia has on several occasions shown serious aspirations to be a leading sea power, something has always happened to upset the realization of this ambition. Her strength has centered on the hordes of her armies, and the Navy has essentially been an adjunct to the Army in the land campaign. Now, in line with a building program, stated by the Russians to be formidable, there is evident determination to cultivate a national pride in naval tradition and achievement of the past.

Soviet Claims

There is a claim that the first submarine was built by Volga Cossacks in the eighteenth century. Russia certainly had no submarines at the time of the Crimean War, 1854-1856, nor is there any record of a Russian submarine taking part in the disastrous Russo-Japanese War, 1903-1905. In 1903, Russia had one submarine completed, while Britain had six, and Germany five. France in 1902 had a flotilla of eight submarines at Cherbourg, four at the Atlantic ports, and two in the Mediterranean. Even as late as World War I,

there is still no record of a Russian submarine achieving any distinction either in the Baltic or in the Black Sea against the Turks. Of their ironclads, the chapter of disasters that befell the expedition from the West to the Far East in 1905 tells its own story.

Director Firing

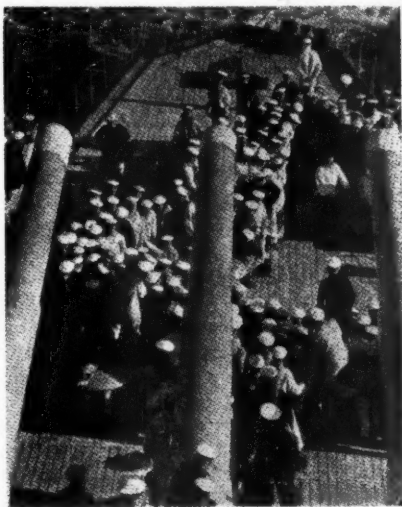
The Russians claim to have been the first with director firing. It is impossible to know what experiments may have been carried out in Russian warships by individual officers, but they can hardly have been earlier than those upon which Admiral Sir Percy Scott engaged as a young lieutenant in the 1890s. An early experimental director firing equipment, designed by Sir Percy Scott, was fitted in HMS *Neptune* (completed 1910), and the system was general in the modern ships of the British Fleet in 1914. No Russian warship had director firing at this date.

So much for the attention that is being paid by the Kremlin to the psychological aspect in providing the men to man the ships. On the practical side of things, Russian lack of "sea sense" is largely attributable to the limitations of her bases of the past due to the winter ice conditions. The outcome of World War II and the subsequent events have provided more ice free ports than have ever before been controlled by the Russian Empire, thus giving the Russians the opportunity of sea training all the year round, which itself is the most telling way of bringing to commanders and men a realization of the importance of sea communications in over-all war strategy.

Submarines

A comparison of results obtained by German U-boats in the last War, and what might be expected from the Russian submarine potential, is open to many influencing factors such as efficiency of per-

sonnel, efficiency of dockyards in carrying out repairs and refits, and allocation of submarines to various purposes. However, it is interesting to note that at the outbreak of war, Germany was credited with 26 ocean-going and 30 coastal submarines. At the beginning of the black year of 1942, when sinkings in the Atlantic were at a peak, it is estimated that there were 91 U-boats available for operations. This number increased to 200 by the end of the year. The German submarine strength was greatest in May 1943, with



Scene on board a Soviet battleship.

an estimated 240 boats fully available for operations, 118 on trials and 67 allocated to the submarine training schools, plus a large building program.

Progress being made on the fast underwater type of submarine is inevitably speculative, but it would be foolish to suppose that its development is not of top priority. Indeed, this type of submarine on the Walter or similar principle must be the ultimate aim. The extent of the difficulties that the Russians are ex-

periencing is probably a matter for conjecture, but with the German technical and scientific knowledge available to advise, it would be surprising if a submarine or submarines of this type are not ready for trials in the foreseeable future. Even if difficulties with the Walter type prove too great, the Russians may well turn their attention to the production of a modified and improved form of Type XXI. So far as "snort" (air intake and exhaust for proceeding permanently submerged) is concerned, the Russians have German designs and "snort" fitted German submarines from which to produce their own device. The fitting of "snort" to new construction cannot present any major difficulty.

Mines

The Russians have always shown interest in mine warfare, and the construction of all their ships down to the smallest motor torpedo boats lays emphasis on fittings for mine carrying or mine laying. In this connection, it is probable that most of her submarines are capable of being used for laying mines, and in addition there are a number of surface minelayers suitable for defensive mine-laying round the coast. Large quantities of mining materials of the latest German types were captured by the Russians, and with the aid of leading German mine experts, production on a large scale does not present any difficulty.

Naval Air

The Naval Air Force is necessarily land based and operated but is independent of the Army Air Force. To estimate the present effective strength is largely crystal gazing, but it is believed to be in the neighborhood of 2,000 front-line aircraft.

The Imperial Russian Navy, while not particularly efficient, possessed a large proportion of natural seamen recruited

from Finland and the Russian Baltic Provinces, on which the Navy relied for the backbone of its man power. Between 1917 and 1945, the Red Navy was deprived of these sources of natural seamen. In strength of numbers, however, it is well provided. The Navy is believed to have demobilized least of all the three fighting services, and since the end of the War, reserve training has been met by an organization called *Dosflot*. *Dosflot* is in reality the naval branch of a union of clubs and societies in all factories, collective farms, etc., run by the Communist Party to provide basic naval training for its members.

Employment

Now let us consider what can only be described as "intelligent deduction" on the Russian application of her Navy, and the unknown or probable numbers of ships. On this point, it is of interest to note the remoteness of the White Sea, Baltic, and Black Sea from the main sea routes. It is inherent in the nature of a dictatorship that its boasts and prognostications must somehow be made to come true. The Law on the current 5-year plan, which ends in 1950, states "the building of a strong and powerful Navy for the USSR shall be ensured. New vessels and bases should be built . . ." In July 1948, on the occasion of Navy Day, the Commander in Chief of the Naval Forces enlarged on the present task of the Soviet Navy. His theme was that now that the Russian controlled seaboard had so greatly increased in length and that Russia herself had emerged as a first class power, the Russian Navy is to be built up to take its place alongside, and if necessary in opposition to, the other navies of the world.

Ships

The Russians do not possess any modern battleships, and they have announced

that the ex-German aircraft carrier *Graf Zeppelin* has been sunk in accordance with treaty obligations. The Russians have little German experience to call upon in these spheres, and they must realize that they cannot hope to outbid Great Britain and the United States in capital ship strength. Russia aims at a surface navy to guard her armies' flanks and to support such amphibious operations as she may undertake. On the other hand, it can be assumed with some confidence that neither time nor effort has been lost in using the knowledge of a large number of experienced German scientists and technicians of all grades to help in developing her submarine strength.

Her surface fleet of cruisers and destroyers consists of six Russian-built cruisers of the modern *Kirov* class and, in addition, the ex-German *Nurnberg* and the ex-Italian *Duca D'Aosta* acquired as part of the share-out of the Italian Fleet. They have at least five modern flotilla leaders of Soviet design, some 40 reasonably modern Russian-built destroyers,

and, in addition, five ex-German and three ex-Italian destroyers, and about a dozen old ships. To this strength must be added some 40 escort destroyers, a number of which are fitted as minesweepers. Her total minesweeper strength, including motor minesweepers, may well reach two or three hundred, and she was allocated about 200 landing craft, mostly ex-German or ex-American. Finally, a number of transports and auxiliaries complete her total resources.

With a main armament of 7.1-inch guns in three triple turrets, and with a high speed, the cruisers are the most powerful units possessed by the Russian Navy. The standard gun in Russian-built flotilla leaders and destroyers is the 5.1-inch high angle/low angle gun fitted in twin and single mountings. They are also fitted with 3-inch standard high angle gun and close-range weapons of the Bofors type.

Submarines undoubtedly form the strongest single arm of the Russian Navy and present strength is approximately 250 of all types.

Oceans are formidable barriers, but to the nation enjoying naval superiority, they become highways of invasion.

General of the Army George C. Marshall

We must make certain that every practicable means is exploited to make the Navy fully ready to defeat a third attempt to deny us the use of the sea by under-sea warfare. At the same time, we must be prepared to prevent aircraft from denying us the use of the sea. Our naval countermeasures against both the submarine and the aircraft must include striking them at their bases as well as local defense against them.

Admiral Forrest Sherman

The Ground Offensive in Atomic Warfare

Digitized by the MILITARY REVIEW from an article by P. H. H. Bryan in "The Fighting Forces" (Great Britain) August 1949.

IN MILITARY action against an atomic armed foe, there can be little doubt of the overwhelming urgency of the first object, which is to nullify or destroy his means of dispatching atomic projectiles. It is this particular urgency that will bring about a strategical pattern in which is woven a reversed sequence of events compared with World War II. In that War, the opposing military forces sought to eliminate each other first, and thence, in the fullness of time and by the virtue of gradually advancing and occupying ground, to overrun the enemy air bases and launching sites.

The cumulative damaging effect of air bombing of the pre-1945 era was such that it could be calculated on the time basis of years. There will, however, be no such saving interval of time under conditions of atomic bombardment. We shall probably never see again the spectacle of great armies engaged in combat on the ground, while overhead bombers of both sides pass each other *en route* to distant cities. In those days, strategical bombing could be regarded as a separate form of warfare remote from the affairs of the infantrymen or the tank crews. Although by 1945 it was beginning to be realized that only land forces could conclusively "rub out" an air base or launching site, there was not sufficient urgency in the problem to warrant the creation of special forces for this purpose.

The threat of atomic bombardment will deter the military commander from committing large (and therefore visible and vulnerable) forces to the traditional land approach. It is therefore probable that the initial effort of a military force in an atomic war will be directed towards destroying the enemy's atomic weapon at its

source, in order to establish tactical freedom of movement for large formations in the subsequent "non-atomic" phase of war. An atomic projectile base may be a well-concreted rocket launching site, a well-fortified airport with underground accommodation, or just one bomb and one plane hiding out in some quarry. Whatever they may be, it seems fairly certain that such bases will, in the main, be relatively immune to counter atomic bombing. The only really effective way to pry open such positions will be to get infantry on the site with grenades and dynamite.

Initial Attack

We can, therefore, look to the first phase of war against an atomic armed opponent as being the dispatch from the homeland of airborne infantry, whose immediate object will be the quelling of atomic fire at the source. The unpredictable will be a strong quantity, for previous intelligence concerning the many enemy bases will no doubt be incomplete and sketchy. And on D+2 of such an operation, the battle map of the commander back home will show a large number of independent little close-assault battles being fought all over enemy territory, each on or near an atomic base. Some of these assaults may have been immediately successful; some may have failed; and there will be unknown and unattacked bases still capable of sending out the atom bomb.

At this stage, the next phase of the offensive will develop: that of following up these first isolated, airborne assaults by the establishment of a supporting base in enemy territory. This supporting base (it might aptly be called "first base") will fulfill many functions. It will provide a

nearer point of resupply and reinforcement by air for the scattered assault forces. It will serve as a protected landing ground for air traffic coming from the homeland. It will constitute the nucleus around which an expanding occupation of the country may develop.

For these purposes, the invading force commander will choose for his first base a town of some 50,000 or more inhabitants, adjacent to which must be situated a fair-sized airport or a long, flat expanse of dry ground capable of being used as a runway. He will usually have a wide selection to choose from, for most nations contain many towns with these simple qualities. The commander will not be unduly concerned at this stage with the traditional military merits and demerits of railways, junctions, or main roads.

The town will be taken and occupied by air-landed assault. As no nation can garrison every sizeable town within its borders without dispersing its military strength to absurdity, this operation may stand a good chance of being bloodless.

Let us assume, then, that such a town has been taken, the air strip prepared. Defense positions have been taken up against a land counterattack by the enemy, sundry little battles on the atomic bases in other parts of the country are being fought out, and air transports are coming in from the homeland. The invading commander may sum up the general situation on the following lines: he is now the occupier of a few square miles of ground in the heart of hostile territory. He can count himself immune from atomic bombing as long as he stays where he is, for this weapon cannot be used against him without wiping out the town and the inhabitants. The only method of transport to and from this area of security that is relatively safe from atomic attack is the fast airplane. In regard to ground movement, he is somewhat of a prisoner within the town boundaries, for as soon

as he commits a large force to the open country the force will be liable to atomic bombardment.

What of the problem of the counterattack by enemy ground forces? Here again, the situation arises in which the enemy, to put in an attack in force, must commit large bodies of men to the dangers of approach over open agricultural country, where they will present a worth-while target for the invader's air support atomic bombs.

It might also be of interest to consider how the population of the captured town would feel about their city being used as a stronghold. At first glance, it might be thought that they would object violently at being thus treated as pawns of war. But closer consideration reveals that, by being occupied by an airborne invader, they, too, are provided with a form of security against atomic bombing. The invader in their midst will spell freedom from the invader's air forces.

In atomic warfare, the advantage of cover and movement is with the invader, inasmuch as every sizeable town or city will provide him with cover from atomic fire. Here the enemy cannot wound him without inflicting an even greater wound upon himself. On the other hand, the invader, learning of an enemy formation located in some enemy town, is hampered by no such consideration and can, if necessary, call upon his atomic-armed air support to deal with such targets. For the invader, the danger zone will be all the open country lying outside the urban areas, for here the division, corps, or larger formation will present a detectable target for the atomic projectile.

It would be well to note here that the analogy between the atom bomb and the thousand-bomber raids of the pre-1945 era is only applicable when assessing the relative damage to property and life within built-up areas. In the field of military tactics, many other factors are

introduced. An air armada, a thousand planes strong, must sacrifice all thoughts of the stealthy, unobserved approach and must rely to a great extent on flight formation and fighter escort for air protection, and upon height for antiaircraft gun protection. Its very numbers would make it an unwieldy method of attack if directed against the vague and ill-defined target of a ground force instead of the clear-cut target presented by a city. If a ground force is protected by a superior fighter support, it can be taken almost as a mathematical certainty that the main co-ordinated effort of the bomber attack will be broken. Although a considerable number of the bombers will undoubtedly get through, the quantity and quality of their bombing will have been so adversely affected by the confusion and loss of control that they will not inflict much serious damage.

Generally speaking, it is the size of an attacking force that constitutes one of its main weaknesses. Whereas you can, by virtue of superior armament, superior numbers, and much planning, guarantee to keep out an air armada, a naval fleet, or a corps, you can never guarantee to keep out one plane or one patrol boat or one infantryman. In atomic warfare, therefore, ground formations can no longer expect that immunity from serious air bombing which, in World War II, could be with confidence insured by the possession of strong fighter cover.

Second Phase

While the enemy still retains the atomic weapon, the bodily occupation of a portion of his country will be restricted to the occupation of towns and cities only. Those who would venture forth on the lands between cities would do so at their peril. After the establishment of the first base, the next project of the invading commander will be the seizure of the neighboring towns, with a view to creat-

ing an expanding network of strongholds or "havens" over a wide area of hostile territory. The same element of surprise which enabled the first base to be captured will not exist when it comes to trying to seize, with airborne troops, contiguous towns. The enemy's attention will now be focused on the first base and the neighboring territory. He may anticipate similar operations on the towns within 50 to 100 miles. It must be remembered that a small amount of ground opposition to the initial stages of an air-landing can cause trouble out of all proportion to its size.

The first step of the "expansion" policy will be the dispatch from the first base of a small reconnaissance task force, mainly armored, and highly mobile. The roles of this force will be: to reconnoiter on a wide front the intervening country between the first base and the next chosen town, with a view to detecting enemy land troops hitherto undetected from the air; to reconnoiter the intended landing strip at the town, and to deal with any light defenses; to carry out any clearing work within its powers, should the landing strip be obstructed; and, in general, to act as the precautionary advanced guard for the subsequent air-landing.

The size of this task force must, of course, be sufficiently small to render it difficult or impossible to be detected from the air, and sufficiently small to be unworthy of atomic fire. It will be essentially a long-range reconnaissance force, travelling on a 20- or 30-mile front for distances of 50 or 100 miles, obtaining information en route with a minimum of fighting, and only converging at its destination to act as a small assault and holding force. Speed will be a necessity, and probably armored cars of the six-wheeled type will be favored rather than the slower and more unreliable tracked vehicle.

The composition of the force will be

about two battalions of armored cars, two companies of assault infantry in armored carriers, and a small engineers' detachment. The armored cars will be extended widely on parallel roads, and the infantry and supporting detachments will travel down the center line. The whole strength of the force may, while moving, be at times dispersed over an area of 300 square miles. This wide dispersal, combined with a rapidly changing position, will give the force comparative security from the air.

For artillery, the force will have at its disposal close-support aircraft of the fighter-bomber type, equipped with small HE bombs and cannon, and stationed within easy reach at the first base. The planes will not take off unless called upon, and any air support undertaken will be controlled by radio by the appropriate ground officer of the detachment that has run into trouble. A couple of light, slow-flying planes of the L-5 type could accompany the force with profit.

When the task force contacts enemy troops of battalion or regiment strength, it will be normally content to report back and keep on moving, leaving the invading commander at the first base to decide if he should take any further action with other forces under his command there. It is possible that the task force may run into an enemy force of division or more strength. Such a target will justify the employment of the atom bomb.

It will be improbable that the commander of the first base (or any other field commander) will have authority to call down atom bombs. The final decision will no doubt be made at a far higher level of command, after considerable check and countercheck of relevant facts and information. This will, of course, create quite a time lag, but such disadvantage will be preferable to the hazards of decentralized control, wherein an incomplete knowledge of the general picture is more

to be expected. For whatever happens, the inadequately or imperfectly informed air pilot must never be in the position of being the arbiter of whether to drop or not to drop the atom bomb. May God help the infantry and tank crews if atom bombs are ever dropped as casually as were the HE bombs of World War II.

To fill this time lag, immediately available close-support aircraft may be called upon to harass the enemy formation, to prevent any extreme movement away from the area on the map where it was first contacted. The enemy will no doubt be only too aware of the penalties accruing from being caught out *en masse*, and, when discovered, will endeavor to disperse on a grand scale.

But there is a limit to the extent to which a formation may spread itself without losing its usefulness as an organized fighting force.

Atom Bombing

However, the difference between the time lag that will ensue from the time the first base commander starts arranging for atom bombing, and the time lag required by a large enemy formation to disperse, should not be very great. By the time the atom bomb plane is overhead, the enemy will not have dispersed very far. The reconnaissance task force, being equipped for speed, will, of course, have been ordered to clear out of the zone as soon as the atom bombing plans have been made.

The destructive effect of the atom bomb used on ground formation will be in no way comparable with its effect on densely packed cities. Nevertheless, a division located within an area of about 6 by 12 miles, if subjected to two or three evenly placed bombs, is bound to suffer severely, no matter what the degree or pattern of dispersal within that area. It is not necessary to kill every man in a military force in order to cripple it. A

loss of some 30 percent effectives, especially if simultaneous, will render most forces temporarily inoperative.

The men of the reconnaissance task force, on their long-range missions, may have to traverse areas recently atom bombed. This introduces some psychological aspects of fear not entirely dissimilar to those created by poison gas in World War I. Fear of blast and bullet is a healthy and understandable emotion. But the fear of the insidious after-effects of nuclear disintegration is a paralyzing, creeping dread that chills the heart and numbs the mind.

The somewhat garbled and censored reports that have thus far come down to us laymen are neither very instructing nor encouraging—and the imagination feeds on ignorance. It is to be hoped that preparation to combat this aspect of future war will be something better than a last-minute pamphlet (telling us, mainly, not to worry) thrust in our hands as we climb in our carriers and armored cars.

Conclusions

The main characteristics of the atomic weapon are its colossal expense and the

consequential enforced economy of use, and its large destructive area with its consequential lack of selectivity.

The most desirable places to be when atomic bombing is in progress are: deep underground; in an airplane; or so close to the enemy that, because of this unselectivity, he is unable to use atomic weapons.

The most undesirable place to be is within a target area, measurable in square miles, where the enemy can hit you without hitting himself as well.

Once a first base has been established by air-landing in enemy territory, the subsequent process of enlarging the occupied area will develop along the tactically traditional method of darting from cover to cover. The cover in future war will be any large concentration of enemy life and property.

When the enemy's means of launching atomic projectiles have been overcome—even though his main military strength on the ground may still be intact—the whole pattern of land warfare changes for the invader. Then he is restored to full surface mobility, and his motor-borne troops and heavy tanks can stream over the land.

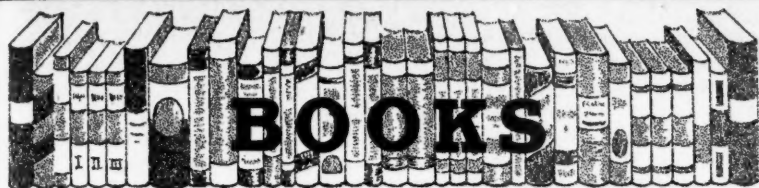
Since we will never start a war, we must predicate our defense plans on the assumption that if war comes we will be attacked, that this attack probably will be a surprise attack and that it probably will be as swift and devastating as the aggressor can possibly make it.

Former Secretary of the Army Gordon Gray

The threat of the atomic bomb may well reduce the size of units in combat. Big supply depots, ports, and even troop concentrations will not be possible.

I do not see how large armies can be supported in combat. I anticipate the use of widely dispersed small forces—combat team size and even smaller—their equipment light—their supplies limited—not only air-supported but probably air-transported and air-supplied.

Lieutenant General Leslie R. Groves



FOR THE MILITARY READER

WARTIME ECONOMIC PLANNING IN AGRICULTURE. By Bela Gold. 594 Pages. Columbia University Press, New York. \$6.75.

America's shortcomings in wartime agricultural planning are laid by the author to confusion about mobilization needs and objectives, weakness in the organization to execute plans, the opposition of special-interest groups, ignorance and apathy of the people generally, and inadequate leadership. The book covers such subjects as mobilization of land and livestock, man power, machinery, fertilizer, credit, food allocation, and distribution.

A COMMUNIST PARTY IN ACTION. An Account of the Organization and Operations in France. By A. Rossi. Translated and edited by Willmoore Kendall. 301 Pages. Yale University Press, New Haven. \$4.00.

This is a study of communist operations in France, written by a former Italian communist who broke with the movement.

THE RED ARMY TODAY. By Colonel Louis B. Ely. Military Service Publishing Co., Harrisburg, Pa. \$3.50.

This evaluation of the Russian Army is based largely on interviews with former Russian and German officers and on documents which have become available since World War II. The author believes that the Russians are relying on a great ground army rather than on their air force or submarine fleet.

DISASTER THROUGH AIR POWER. By Marshall Andrews. 143 Pages. Rinehart & Company, Inc., New York. \$2.00.

The avowed purpose of *Disaster Through Air Power* is to counter the concepts developed by strategic air power enthusiasts and to re-establish public thinking along the lines of balanced forces.

The author is firmly convinced that air power has erected about itself a wall of propaganda so formidable that it could lead to national military disaster.

Air power proponents, Andrews contends, are attempting to substitute the "military verities" for "a single doctrine based on a single weapon." "Never before," he says, "has a weapon served as a basis for a military doctrine complete with victory guaranteed."

This is the author's reasoning:

America fought the War with no policy for the coming peace. Since the US will never be party to aggressive war, an enemy is handed the initiative. If the first blow of a future war is to be decisive, the situation appears hopeless.

Air power concepts contemplate long raids, high speeds, and atomic and other explosives against all centers of an enemy's war-making potential. Ground troops would move in later to occupy territory already won.

On the other hand, a balanced force would use all elements of Allied power, drawing strength from each. Unless his army is destroyed by land action, an enemy could still maintain his political system

somewhere in Europe. Holding Europe in the first place is possible.

Air power proponents do not understand sea power. In the naval battles of World War II, the plane was just another weapon; it did not alter fundamentals.

Tactical air support of ground operations is the "stepchild" of air power; the Air Force is not prepared to gain command of the air, and it expects to fight at long range from North America.

The "ultimate weapon" is the foot soldier. There is need for a plan of general military training, and a reversal of the War policy which favored armor, air, and navy, "despite the fact that the foot soldier was destined to carry the brunt of the battle."

The Army must stop "rolling over at Air Force bidding" and make known what it does and what it needs.

These, briefly, are Andrews' arguments. He then offers "one man's solution":

Adopt a realistic military policy that dispels the belief that wars can be won easily; recognize that a third world war would bring war to the Western Hemisphere if US strategy is based only on inter-continental bombing; make the public realize that the citizen must be given military training; develop greater efficiency in the services; reduce logistical overhead; abandon the concept of forces on the basis of weapons and reorganize on functional lines, with a three-service combat force, a logistical force, and a support force; establish a Chief of Staff for the military establishment with a joint staff; give the Army its own tactical aviation for close support.

Mr. Andrews' book will unquestionably generate much contention. He will doubtless consider the effort worth while, however, if it stirs the public to a greater appreciation of balanced forces. The author is a military writer of long experience on the staff of the *Washington Post*.

ROOSEVELT'S GOOD NEIGHBOR POLICY. By E. O. Guerrant. 248 Pages. University of New Mexico Press, Albuquerque. \$3.50.

This book deals with President Roosevelt's program of co-operation with the Latin-American nations from its inception in 1933 through World War II.

COMBAT COMMAND: The American Aircraft Carriers in the Pacific War. By Admiral Frederick C. Sherman, USN (Ret.). 427 Pages. E. P. Dutton, New York. \$5.00.

Admiral Sherman has compressed into one volume a history of the American naval war in the Pacific. The book emphasizes the dominance that aircraft carriers and their planes have assumed in naval warfare.

DATELINE: WASHINGTON. The Story of National Affairs Journalism. Edited by Cabell Phillips and Duncan Aikman. 320 Pages. Doubleday and Co., New York. \$4.00.

BRAZIL: WORLD FRONTIER. By Benjamin H. Hunnicutt. 387 Pages. D. Van Nostrand Company, New York. \$6.00.

LOUIS PASTEUR: Free Lance of Science. By Rene J. Dubos. 418 Pages. Little, Brown & Co., Boston. \$5.00.

THE WESTERN WORLD AND JAPAN. By G. B. Sansom. 504 Pages. Alfred A. Knopf, New York. \$6.00.

HISTORY OF THE NATIONAL ECONOMY OF RUSSIA TO THE 1917 REVOLUTION. By Peter I. Lyashchenko. Translated by L. M. Herman. 880 Pages. The Macmillan Company, New York. \$13.00.

NEW WORLD OF SOUTHEAST ASIA. By Lennox A. Mills and associates. 445 Pages. University of Minnesota Press, Minneapolis. \$5.00.